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Bureau of Agricultural and Industrial Chemistry
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Philadelphia 18, Pennsylvania

LIST OF PUBLICATIONS AND PATENTS

ANIMAL FATS DIVISION

When a reprint is requested, give the number of the publication.

1940

Publications

6 Scanlan, John T., and Swern, Daniel
ACTION OF LEAD TETRACETATE UPON HYDROXYLATED FAT ACIDS AND RELATED COMPOUNDS. I. HYDROXYLATED OLEIC ACID, ETHYL OLEATE, AND OLEYL ALCOHOL. Journal of the American Chemical Society, vol. 62, p. 2305-2308, September 1940.

7 Scanlan, John T., and Swern, Daniel
ACTION OF LEAD TETRAACETATE UPON HYDROXYLATED FAT ACIDS AND RELATED COMPOUNDS. II. HYDROXYLATED RICINOLEIC ACID AND CASTOR OIL. Journal of the American Chemical Society, vol. 62, p. 2309-2311, September 1940.

9. Stirton, A. J., Peterson, R. F., and Groggins, P. H.
SULFONATED ARYL STEARIC ACIDS. Industrial and Engineering Chemistry, vol. 32, p. 1136-1137, August 1940.

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33. Swern, Daniel, Stirton, A. J., and Groggins, P. H.
AZO DYES FROM OLEIC ACID. Oil and Soap, vol. 18, p. 222-224, November 1941.

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Scanlan, John T., and Swern, Daniel
PROCESS FOR PREPARING ALDEHYDES. U. S. Patent No. 2,285,059, issued June 2, 1942.

Scanlan, John T., and Swern, Daniel
PROCESS FOR PRODUCING ALDEHYDES. U. S. Patent No. 2,304,064, issued December 8, 1942.

Stirton, Alexander J., Peterson, Robert F., and Groggins, Philip H.
WETTING AGENTS. U. S. Patent No. 2,302,070, issued November 17, 1942.

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* Copies of Patents may be purchased from The United States Patent Office Washington 25, D. C.

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58 Riemenschneider, R. W., Turer, J., and Speck, R. M.
MODIFICATIONS OF THE SWIFT STABILITY TEST. Oil and Soap, vol. 20, p. 169-171, September 1943.

60 Swern, Daniel, Stirton, A. J., Turer, J., and Wells, P. A.
FATTY ACID MONOESTERS OF l-ASCORBIC ACID AND d-ISOASCORBIC ACID. Oil and Soap, vol. 20, p. 224-226, November 1943.

1944

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91 Riemenschneider, R. W., and Ault, W. C.
HOW TO EVALUATE AND IMPROVE THE STABILITY OF FATTY FOODS. Food Industries, vol. 16, p. 892-894, 936-939, November 1944.

92 Riemenschneider, R. W., Herb, S. F., Hammaker, E. M., and Luddy, F. E.
EFFECT OF DEODORIZATION AND ANTIOXIDANTS ON THE STABILITY OF LARD. Oil and Soap, vol. 21, p. 307-309, October 1944.

93 Riemenschneider, R. W., Turer, J., and Ault, W. C.
IMPROVEMENT PRODUCED IN THE STABILITY OF LARD BY THE ADDITION OF VEGETABLE OILS. Oil and Soap, vol. 21, p. 98-100, April 1944.

94 Riemenschneider, R. W., Turer, J., Wells, P. A., and Ault, W. C.
FATTY ACID MONOESTERS OF l-ASCORBIC AND d-ISOASCORBIC ACIDS AS ANTIOXIDANTS FOR FATS AND OILS. Oil and Soap, vol. 21, p. 47-50, February 1944.

97 Schaeffer, B. B., Roe, E. T., Dixon, J. A., and Ault, W. C.
FORMATION OF ISOMERIC HYDROXY ACIDS BY SULFATION OF OLEIC ACID. Journal of the American Chemical Society, vol. 66, p. 1924-1925, November 1944.

102 Stirton, A. J., Hammaker, E. M., Herb, S. F., and Roe, E. T.
COMPARISON OF FAT-SPLITTING REAGENTS IN THE TWITCHELL PROCESS. Oil and Soap, vol. 21, p. 148-151, May 1944.

103 Swern, Daniel, Findley, Thomas W., and Scanlan, John T.
EPOXIDATION OF OLEIC ACID, METHYL OLEATE, AND OLEYL ALCOHOL WITH PERBENZOIC ACID. Journal of the American Chemical Society, vol. 66, p. 1925-1927, November 1944.

104 Swern, Daniel, Knight, H. B., and Findley, T. W.
PURIFICATION OF OLEIC ACID, METHYL OLEATE AND OLEYL ALCOHOL FOR USE AS CHEMICAL INTERMEDIATES. Oil and Soap, vol. 21, p. 133-139, May 1944.

106 Turer, J., and Speck, R. M.
DETERMINATION OF FATTY ACID MONOESTERS OF l-ASCORBIC AND d-ISOASCORBIC ACIDS IN FATS AND OILS. Industrial and Engineering Chemistry, Analytical Edition, vol. 16, p. 464-465, July 1944.

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Wells, Percy A., and Swern, Daniel
DERIVATIVES OF ASCORBIC ACID. U. S. Patent No. 2,350,435, issued June 6, 1944.

1945

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115 Brice, Brooks, A., and Swain, Margaret L.
ULTRAVIOLET ABSORPTION METHOD FOR THE DETERMINATION OF POLYUNSATURATED CONSTITUENTS IN FATTY MATERIALS. Journal of the Optical Society of America, vol. 35, p. 532-544, August 1945.

116 Brice, B. A., Swain, Margaret L., Schaeffer, B. B., and Ault, W. C.
SPECTROPHOTOMETRIC DETERMINATION OF SMALL PROPORTIONS OF POLYUNSATURATED CONSTITUENTS IN FATTY MATERIALS. Oil and Soap, vol. 22, p. 219-224, September 1945.

123 Findley, Thomas W., Swern, Daniel, and Scanlan, John T.
EPOXIDATION OF UNSATURATED FATTY MATERIALS WITH PERACETIC ACID IN GLACIAL ACETIC ACID SOLUTION. Journal of the American Chemical Society, vol. 67, p. 412, March 1945.

145 Riemenschneider, R. W., Luddy, F. E., Herb, S. F., and Turer, J.
STABILITY VALUES OBTAINED BY DIFFERENT RAPID METHODS AS A MEANS OF EVALUATING ANTIOXIDANTS FOR FATS AND OILS. Oil and Soap, vol. 22, p. 174-177, July 1945.

146 Riemenschneider, R. W., and Speck, R. M.
STABILITY VALUES OF FATS BY THE ACTIVE OXYGEN METHOD AND BY STORAGE IN GLASS VIALS. Oil and Soap, vol. 22, p. 23-25, January 1945.

147 Riemenschneider, R. W. Speck, R. M., and Beinhart, E. G.
ANALYSIS AND FATTY ACID COMPOSITION OF TOBACCO SEED OILS. Oil and Soap, vol. 22, p. 120-122, May 1945.

152 Stirton, A. J., Turer, J., and Riemenschneider, R. W.
OXYGEN ABSORPTION OF METHYL ESTERS OF FAT ACIDS AND THE EFFECT OF ANTIOXIDANTS. Oil and Soap, vol. 22, p. 81-83, April 1945.

153 Swern, Daniel, Billen, Geraldine N., Findley, Thomas W., and Scanlan, John T.
HYDROXYLATION OF MONOUNSATURATED FATTY MATERIALS WITH HYDROGEN PEROXIDE. Journal of the American Chemical Society, vol. 67, p. 1786-1789, October 1945.

154 Swern, Daniel, and Jordan, E. F., Jr.
ALIPHATIC ESTERS OF THE 9,10-DIHYDROXYSTEARIC ACIDS. Journal of the American Chemical Society, vol. 67, p. 902-903, June 1945.

155 Swern, Daniel, Knight, H. B., Scanlan, John T., and Ault, W. C.
CATALYTIC AIR OXIDATION OF METHYL OLEATE AND CHARACTERIZATION OF THE POLYMERS FORMED. Journal of the American Chemical Society, vol. 67, p. 1132-1135, July 1945.

156 Swern, Daniel, Knight, H. B., Scanlan, John T., and Ault, Waldo C.
FRACTIONATION OF TALLOW FATTY ACIDS. PREPARATION OF PURIFIED OLEIC ACID AND AN INEDIBLE OLIVE OIL SUBSTITUTE. Oil and Soap, vol. 22, p. 302-304, November 1945.

Patents

Riemenschneider, Roy W., and Turer, Jack
ANTIOXIDANT COMPOSITIONS. U. S. Patent No. 2,375,250, issued May 8, 1945.

Riemenschneider, Roy W., and Turer, Jack
TERNARY SYNERGISTIC ANTIOXIDANT COMPOSITION. U. S. Patent No. 2,383,815, issued August 8, 1945.

Riemenschneider, Roy W., and Turer, Jack
ALKALI COMPOUNDS CONTAINING ANTIOXIDANT COMPOSITIONS. U. S. Patent No. 2,383,816, issued August 8, 1945.

Wells, Percy A., and Riemenschneider, Roy W.
ANTIOXIDANT. U. S. Patent No. 2,368,435, issued January 30, 1945.

1946

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January - June

183 Morris, Steward G., and Riemenschneider, R. W.
THE HIGHER FATTY ALCOHOL ESTERS OF GALLIC ACID. Journal of the American Chemical Society, vol. 68, p. 500-501, March 1946.

188 Swern, Daniel, Scanlan, John T., and Roe, Edward T.
SELECTIVE HYDROGENATION IN THE PREPARATION OF PURIFIED OLEIC ACID FROM ANIMAL FATS. ELIMINATION OF EXTREMELY LOW CRYSTALLIZATION TEMPERATURES. Oil and Soap, vol. 23, p. 128-131, April 1946.

Publications

July - December

198 Knight, H. B., Jordan, E. F., Jr., and Swern, Daniel
IDENTIFICATION OF THE LINOLEIC AND LINOLENIC ACIDS OF BEEF TALLOW. Journal of Biological Chemistry, vol. 164, p. 477-482, July 1946.
By use of the tetra- and hexa-bromide techniques, evidence is presented that the nonconjugated octadecadienoic and trienoic acids of beef tallow consist mainly of cis,cis-9,12-linoleic acid and cis,cis,cis-9,12,15-linolenic acid, respectively.

199 Luddy, F. E. and Riemenschneider, R. W.
DETERMINATION OF TRI-SATURATED GLYCERIDES IN LARD, HYDROGENATED LARD, AND TALLOW. Oil and Soap, vol. 23, p. 385-389, December 1946.
Crystallization conditions are described which are suitable for estimation of the tri-saturated glycerides in lard, hydrogenated lard, and tallow. The chief advantage of the method is that it requires much less time than previous methods.

207 Riemenschneider, R. W., Luddy, Francis E., Swain, Margaret L., and Ault, Waldo C.
FRACTIONATION OF LARD AND TALLOW BY SYSTEMATIC CRYSTALLIZATION. Oil and Soap, vol. 23, p. 276-282, September 1946.
Lard and edible tallow were subjected to a series of fractional crystallizations from acetone at temperatures ranging from 20° to -45° C. Six recrystallized precipitate fractions and a filtrate residue were obtained from each fat. The physical and chemical characteristics of each fraction were determined and compared.

210 Swern, Daniel, Billen, Geraldine N., and Scanlan, John T.
HYDROXYLATION AND EPOXIDATION OF SOME 1-OLEFINS WITH PER-ACIDS. Journal of the American Chemical Society, vol. 68, p. 1504-1507, August 1946.
Six straight-chain 1-olefins when hydroxylated with hydrogen peroxide in formic acid solution gave good yields of the corresponding 1,2-glycols. Only 1.025 to 1.05 moles of hydrogen peroxide were required per mole of olefin. When epoxidized with peracetic acid in acetic acid solution, the same olefins gave only fair yields of the corresponding 1,2-epoxides.

211 Swern, Daniel, Jordan, E. F., Jr., and Knight, H. B.
UNSATURATED ALCOHOL ESTERS OF THE 9,10-DIHYDROXYSTEARIC ACIDS. PREPARATION OF ELAIDYL ALCOHOL. Journal of the American Chemical Society, vol. 68, p. 1673-1674, August 1946.
The allyl, methallyl, beta-chloroallyl, furfuryl, oleyl, elaidyl and cinnamyl esters of both high-melting and low-melting forms of dihydroxy acids are described. Two procedures for preparing elaidyl alcohol are also described. Some of the esters appear to be good plasticizers for cellulose-type plastics.

Patents

July - December

Swern, Daniel
9,10-EPOXYOCTADECANOL AND PROCESS FOR ITS PREPARATION. U. S. Patent No. 2,411,762, issued November 26, 1946.

Wells, Percy A., and Swern, Daniel
DERIVATIVES OF ISOASCORBIC ACID. U. S. Patent No. 2,408,182, issued September 24, 1946.

Wells, Percy A., and Swern, Daniel
DERIVATIVES OF ISOASCORBIC ACID. U. S. Patent No. 2,408,897, issued October 8, 1946.

1947

Publications

January - June

222 Knight, H. B., Jordan, E. F., and Swern, Daniel
ESTERS OF LONG-CHAIN, HYDROXY ALIPHATIC ACIDS. Journal of the American Chemical Society, vol. 69, p. 717-718, March 1947.
The properties of three new esters, namely, 9,10-dihydroxyoctadecyl 12-hydroxystearate, 9,10-dihydroxyoctadecyl 9,10,12-trihydroxystearate, and tetrahydrofurfuryl 9,10-dihydroxystearate, are given.

231 Riemenschneider, Roy W.
OXIDATIVE RANCIDITY AND THE USE OF ANTIOXIDANTS. American Association of Cereal Chemists, Transactions, vol. 5, p. 50-59, April 1947.
Atmospheric oxidation of fats, the role of antioxidants and synergists, and factors important to the effective use of inhibitors are discussed. Compounds that have received considerable recognition in the literature as antioxidants for fats are reviewed, and typical data relative to their use in lard substrates are cited. The effect of the polyunsaturated acid content of the substrate on the efficiency of antioxidants is illustrated by stability tests on pure methyl oleate and methyl linoleate containing added antioxidants. The use of antioxidants in shortenings for baked products and factors that influence the keeping qualities of these products are reviewed.

232 Riemenschneider, R. W., Ault, W. C., and Wells, P. A.
IMPROVING THE KEEPING QUALITY OF HOME-RENDERED LARD. AIC-157, June 1947. (Processed.)
A method for improving the keeping quality of lard is described. The method, which involves the addition of approximately 5 percent of hydrogenated vegetable shortening to the lard during or immediately after rendering, is suitable for use by farmers or custom-renderers.

233 Roe, Edward T., Schaeffer, Benjamin B., Dixon, Joseph A., and Ault, Waldo C.
PREPARATION OF HYDROXY ACIDS BY SULFATION OF OLEIC AND LINOLEIC ACIDS. Journal of the American Oil Chemists' Society, vol. 24, p. 45-48, February 1947.
Hydroxy acids were prepared in good yield from commercial and purified oleic acid and in fair yield from purified linoleic acid.

236 Swern, Daniel, Findley, Thomas W., Billen, Geraldine N., and Scanlan, John T.
DETERMINATION OF OXIRANE OXYGEN. Analytical Chemistry, vol. 19, p. 414-415, June 1947.
A general procedure for the determination of oxirane oxygen is described which is based on the quantitative opening of the oxirane ring by means of a 0.2 N solution of anhydrous hydrogen chloride in absolute ethyl ether. The method is specific for the determination of oxirane oxygen; it may be employed in the analysis and determination of the purity of a wide variety of oxirane compounds; and it is suitable for the determination of oxirane oxygen in air-oxidation reaction mixtures.

Publications

July - December

242 Ault, Waldo C., and Swain, Margaret L. (ERRL), and Curtis, Lawrence C. (University of Connecticut)
OILS FROM PERENNIAL GOURDS. Journal of the American Oil Chemists' Society, vol. 24, p. 289-290, September 1947.
Analytical data are given pertaining to the seed as well as oil from the seed of two perennial gourds, Curcurbita palmata and Cucurbita digitata, which grow wild in arid regions of the Southwestern States. The most unusual feature of the oils is the presence of about 10.0 to 20.0 percent of a conjugated trienoic acid.

243 Ault, Waldo C., Weil, James K., and Nutting, George C. (ERRL), and Cowan, J. C. (Northern Regional Research Laboratory)
DIRECT ESTERIFICATION OF GALLIC ACID WITH HIGHER ALCOHOLS. Journal of the American Chemical Society, vol. 69, p. 2003-2005, August 19[illegible]
A procedure for the direct esterification of gallic acid with the higher normal aliphatic alcohols is described. Yields of lauryl gallate of the order of 70-80 percent of the theoretical yield (based on the gallic acid used) are obtained.

254 Morris, Steward G., Kraekel, Lillian A., Hammer, Dorothy, Myers, J. S., and Riemenschneider, R. W.
ANTIOXIDANT PROPERTIES OF THE FATTY ALCOHOL ESTERS OF GALLIC ACID. Journal of the American Oil Chemists' Society, vol. 24, p.309-311, September 1947.
The antioxidant properties of octyl, dodecyl, tetradecyl, hexadecyl, and octadecyl gallates in fat substrates were determined by the Swift stability test. The carry-over of the antioxidant properties into baked goods was determined by storage tests on piecrust at 38° C. (100° F.) and 63° C. (145° F.).

260 Schaeffer, B. B., and Stirton, A. J.
ALIPHATIC AND AROMATIC SULFONATES OF PHENYLOCTADECANE. Journal of the American Chemical Society, vol. 69, p. 2071-2072, August 1947.
Methods suitable for use in the preparation of the barium salts of the two isomeric sulfonic acids

(I) $CH_3(CH_2)_xCH(CH_2)_yCH_3$ with $C_6H_4SO_3H$ and (II) $CH_3(CH_2)_xCH(CH_2)_yCH_2SO_3H$ with C_6H_5

are described. Certain properties of the intermediate and final products are also given.

262 Swern, Daniel
ELECTRONIC INTERPRETATION OF THE REACTION OF OLEFINS WITH ORGANIC PERACIDS. Journal of the American Chemical Society, vol. 69, p. 1692-1698, July 1947.
An electronic interpretation of the reaction of olefins with organic peracids, based on the change in the nucleophilic properties of the double bond as a result of neighboring substituent groups, is proposed. By application of the principles discussed in this paper, the difference in the rates of reaction of various olefins with organic peracids can be readily explained, and much information can be obtained regarding the positions of the double bonds in mixtures of olefins isolated from dehydration, dehalogenation, dehydrohalogenation, and olefin polymerization reactions.

263 Swern, Daniel, Billen, Geraldine N., and Knight, H. B.
PREPARATION OF SOME POLYMERIZABLE ESTERS OF OLEIC ACID WITH UNSATURATED ALCOHOLS. Journal of the American Chemical Society, vol. 69, p. 2439-2442, October 1947.
Eight esters of oleic acid, namely, vinyl, allyl, 2-chloroallyl, methallyl (2-methylallyl), crotyl, 1-buten-3-yl (1-methylallyl), furfuryl, and oleyl oleate, have been prepared in good yield, and some of their properties have been determined. The peroxide-catalyzed copolymerization of these esters with vinyl acetate, as well as their polymerization, has been studied.

1948

Publications
January - June

288 Swern, Daniel, Billen, Geraldine N., and Scanlan, John T.
CHEMISTRY OF EPOXY COMPOUNDS. V. PREPARATION OF SOME HYDROXY-ETHERS FROM 9,10-EPOXYSTEARIC ACID AND 9,10-EPOXYOCTADECANOL. Journal of the American Chemical Society, vol. 70, p. 1226-1228, March 1948.
Methyl-9,10(10,9)-methoxyhydroxystearate, 9,10(10,9)-methoxyhydroxyoctadecanol and the corresponding derivatives in which the methyl groups of the above compounds are replaced by ethyl, n-propyl, n-butyl, iso-butyl and allyl groups, respectively, were prepared. The allyl derivatives were copolymerized with vinyl acetate.

289 Swern, Daniel, Billen, Geraldine N., and Eddy, C. Roland
CHEMISTRY OF EPOXY COMPOUNDS. VI. THERMAL POLYMERIZATION OF THE ISOMERIC 9,10-EPOXYSTEARIC ACIDS. Journal of the American Chemical Society vol. 70, p. 1228-1235, March 1948.
The thermal polymerization of the two isomeric 9,10-epoxystearic acids derivable from oleic and elaidic acids has been quantitatively studied. Both isomers can be polymerized to the gel stage, although linear polyester formation undoubtedly predominates. For the low-melting isomer, reaction rate constants and activation energy have been calculated. The polymers just prior to the gel stage are viscous, colorless oils, soluble in many common organic solvents and insoluble in water and aliphatic hydrocarbons.

290 Swern, Daniel
CHEMISTRY OF EPOXY COMPOUNDS. VII. STEREOCHEMICAL RELATIONSHIPS BETWEEN THE EPOXY-, CHLOROHYDROXY- AND DIHYDROXYSTEARIC ACIDS DERIVED FROM OLEIC AND ELAIDIC ACIDS. Journal of the American Chemical Society, vol. 70, p. 1235-1240, March 1948.
A reaction scheme is described which correlates the configurational relationships in the conversion of oleic and elaidic acids (cis- and trans-9-octadecenoic acids, respectively) to 9,10-dihydroxystearic acids by way of the intermediate oxirane and chlorohydroxy compounds. This scheme is self-consistent and is in harmony with accepted theories of the Walden inversion and double bond addition reactions.

291 Swern, Daniel, Scanlan, John T., and Knight, H. B.
MECHANISM OF THE REACTIONS OF OXYGEN WITH FATTY MATERIALS. ADVANCES FROM 1941 THROUGH 1946. Journal of the American Oil Chemists' Society, vol. 25, p. 193-200, June 1948.
A review is given of advances in the mechanism of oxidation of fatty materials with oxygen from 1941 through 1946. Subjects discussed are the oxidation of monounsaturated compounds, non-conjugated and conjugated polyunsaturated compounds, and saturated compounds. The hydroperoxide theory of oxidation is discussed in detail.

Patents
January - June

Riemenschneider, Roy W., and Turer, Jack
SYNERGISTIC ANTIOXIDANT COMPOSITION OF THE ACIDIC TYPE. U. S. Patent No. 2,440,383, issued April 27, 1948.

Schaeffer, Benjamin B.
PROCESS FOR PREPARING AN ALKYLOLAMIDE OF A TRIHYDROXYSTEARIC ACID. U. S. Patent No. 2,440,349, issued April 27, 1948.

Swern, Daniel, Scanlan, John T.
HYDROXYLATION PROCESS. U. S. Patent No. 2,443,280, issued June 15, 1948.

Publications

July - December

320 Stirton, A. J., Schaeffer, B. B., Stawitzke, Anna A., Weil, J. K., and Ault, Waldo C.
ARYLSTEARIC ACIDS FROM OLEIC ACID. VARIABLES AFFECTING THE YIELD AND PROPERTIES. Journal of the American Oil Chemists Society, vol. 25, p. 365-368, October 1948.
Twenty-five aromatic compounds were compared in the synthesis of arylstearic acids from oleic acid by the Friedel and Crafts reaction. Xylylstearic acid was the arylstearic acid obtained in the highest yield (92.4%), from technical m-xylene and commercial oleic acid. Oleic acid of about 95% purity did not improve the yield but resulted in nearly colorless, rather than yellow, viscous oils.

321 Swern, Daniel, and Jordan, E. F., Jr.
PREPARATION OF SOME POLYMERIZABLE ESTERS OF LONG-CHAIN SATURATED ALIPHATIC ACIDS WITH UNSATURATED ALCOHOLS. Journal of the American Chemical Society, vol. 70, p. 2334-2339, July 1948.
Vinyl 2-chloroallyl, methallyl, allyl, 3-buten-2-yl, crotyl and furfuryl esters of caproic, caprylic, pelargonic, capric, lauric, myristic, palmitic, and stearic acids have been prepared, and some of their properties have been determined. Polymers, as well as copolymers with some reactive short chain olefinic monomers, have been prepared from the more reactive esters, particularly the vinyl esters.

Patents

July - December

Ault, Waldo C., and Schaeffer, Benjamin B.
RUBBERLIKE PRODUCT AND PROCESS OF PREPARATION. U. S. Patent No. 2,452,092, issued October 26, 1948.

Schaeffer, Benjamin B.
ALKYLOL AMINE SALTS OF HYDROXY FATTY ACIDS AND PROCESS FOR THEIR PREPARATION. U. S. Patent No. 2,448,626, issued Sept. 7, 1948.

Swern, Daniel, and Ault, Waldo C.
PROCESS FOR THE PREPARATION OF MONOETHENOIC ACIDS AND THEIR ESTERS. U. S. Patent No. 2,457,611, issued December 28, 1948.

Swern, Daniel, and Billen, Geraldine N.
1,2-EPOXIDES AND PROCESS FOR THEIR PREPARATION. U. S. Patent No. 2,457,328, issued December 28, 1948.

Swern, Daniel, and Billen, Geraldine N.
POLYMERS OF 9,10-EPOXYOCTADECANOL AND PROCESSES FOR THEIR PREPARATION. U. S. Patent No. 2,457,329, issued December 28, 1948.

Swern, Daniel and Findley, Thomas W.
AMINO FATTY DERIVATIVES. U. S. Patent No. 2,445,892, issued July 27, 1948.

1949

Publications

January - June

346 Morris, Steward G.
PREPARATION OF GENTISIC ACID AND ITS FATTY ALCOHOL ESTERS. Journal of the American Chemical Society, vol. 71, p. 2056-2057, June 1949.
Gentisic acid and its normal octyl, dodecyl, tetradecyl, hexadecyl and octadecyl esters were synthesized for use as antioxidants in fats.

350 Roe, Edward T., Scanlan, John T., and Swern, Daniel
CHEMISTRY OF EPOXY COMPOUNDS. IX. EPOXIDATION OF OLEAMIDE AND N-SUBSTITUTED OLEAMIDES WITH PERACETIC ACID. Journal of the American Chemical Society, vol. 71, p. 2219-2220, June 1949.
Peracetic acid in acetic acid solution has been used to epoxidize some long-chain monounsaturated amides. 9,10-Epoxystearamide and a series of N-substituted 9,10-epoxystearamides have been prepared in 30-90 percent yield by the epoxidation of oleamide and N-substituted oleamides.

351 Roe, Edward T., Scanlan, John T., and Swern, Daniel
FATTY ACID AMIDES. I. PREPARATION OF AMIDES OF OLEIC AND THE 9,10-DIHYDROXYSTEARIC ACIDS. Journal of the American Chemical Society, vol. 71, p. 2215-2218, June 1949.
Methods of preparing oleamide and N-(n-alkyl) oleamides from methyl through hexyl and the even members from octyl through octadecyl have been studied, and the amides have been obtained in good yield. N-(2-hydroxyethyl) oleamide, N-acetyloleamide, and several representative N-aryloleamides and N-alkyl-9,10-dihydroxystearamides have also been prepared. Most of these amides have not been recorded in the literature; with few exceptions the others are purer than the corresponding products previously reported.

352 Scanlan, John T., Stirton, A. J., Swern, Daniel, and Roe, Edward T.
EFFECT OF VARIOUS SURFACE-ACTIVE AGENTS ON THE PENETRATING POWER AND STABILITY OF CALCIUM HYPOCHLORITE AND BLEACHING POWDER SOLUTIONS. American Dyestuff Reporter, vol. 38, p. 455-458, June 13, 1949.
In concentrated calcium hypochlorite solutions, 0.5 percent of Tergitol 08 or 1 percent of Gardinol LS Paste contributed satisfactory penetrating properties. In concentrated bleaching powder solutions, 1 percent of Tergitol 08, Naccosol A, Novonacco, or Aerosol MA contributed satisfactory penetrating properties. When 2 percent or more of Ultrawet D-4, Sulfatate, or Alkanol S was used, they also were fairly satisfactory. Aerosol MA accelerated decomposition of hypochlorite ion. The Draves-Clarkson test was used for the determination of penetrating power.

354 Swain, Margaret L., and Brice, B. A.
FORMATION OF TRACES OF CONJUGATED TETRAENOIC AND TRIENOIC CONSTITUENTS IN AUTOXIDIZED LINOLENIC AND LINOLEIC ACIDS AND VEGETABLE OILS DURING ALKALI ISOMERIZATION. Journal of the American Oil Chemists' Society, vol. 26, p. 272-277, June 1949.
It has been shown that the low-intensity absorption bands characteristic of conjugated tetraenoic and trienoic fatty acids frequently encountered in the ultraviolet spectra of alkali-isomerized vegetable oils prepared by ordinary commercial or laboratory extraction techniques probably have their origin in oxidation products of linolenic and linoleic acid, respectively. Similar bands are found in the spectra of mildly autoxidized preparations of pure linolenic and linoleic acids after either alkali-isomerization or heating at 180° C. in neutral glycol. Tetraenoic and trienoic conjugation formed from oxidation products of linolenic and linoleic acids during alklai-isomerization can be differentiated from the tetraenoic and trienoic conjugation produced by alkali-isomerization of arachidonic and linolenic acids, respectively, by spectrophotometric examination of the sample after heating in neutral glycol. Equal amounts of conjugation are formed from the fatty acid oxidation products on heating and on alkali-isomerization, whereas no conjugation is obtained from arachidonic and linolenic acids on heating in the absence of alkali.

356 Swern, Daniel, Billen, Geraldine N., and Knight, H. B.
CHEMISTRY OF EPOXY COMPOUNDS. VIII. REACTION OF ALLYL ALCOHOL WITH UNSYMMETRICAL OXIRANE COMPOUNDS. AN ELECTRONIC INTERPRETATION. Journal of the American Chemical Society, vol. 71, p. 1152-1156, April 1949.
The reaction of allyl alcohol with the unsymmetrical oxirane compounds propylene oxide, glycidol, 3,4-epoxy-1-butene, epichlorohydrin, and styrene oxide, in the presence of acidic and alkaline catalysts, has been studied. Reaction conditions are described for obtaining good yields (60 to 90 percent) of hydroxy ethers, and electronic mechanisms for the reactions are proposed.

Publications

July - December

362 Ault, Waldo C., Brice, B. A., Swain, Margaret L., Schaeffer, B. B., and Copley, M. J.
POLYUNSATURATED FATTY ACID RETARDERS IN THE EMULSION POLYMERIZATION OF GR-S SYNTHETIC RUBBER. Journal of the American Oil Chemists Society, vol. 26, p. 700-704, December 1949.
This paper describes research on development of soaps from partially and selectively hydrogenated tallows for use as emulsifiers in the manufacture of synthetic rubber GR-S. Data are presented which served as a basis for specifications for suitable soap.

370 Jordan, E. F., Jr., and Swern, Daniel
PREPARATION OF SOME POLYMERIZABLE ESTERS OF 10-HENDECENOIC (UNDECYLENIC) ACID. Journal of the American Chemical Society, vol. 71, p. 2377-2379, July 1949.
Seven esters of 10-hendecenoic (undecylenic) acid were prepared in good yield from 10-hendecencic acid or its methyl ester and the appropriate alcohol. Some of their properties were determined. The benzoyl peroxide-initiated polymerization of some of the esters and their copolymerization with vinyl acetate were studied briefly.

371 Knight, H. B., and Swern, Daniel
REACTIONS OF FATTY MATERIALS WITH OXYGEN. IV. QUANTITATIVE DETERMINATION OF FUNCTIONAL GROUPS. Journal of the American Oil Chemists' Society, vol. 26, p. 366-370, July 1949.
Conventional analytical procedures employed in oxidation reactions for the quantitative determination of functional groups were applied to a series of pure compounds, as well as to two synthetic mixtures and to methyl oleate hydroperoxide (estimated purity, 70 percent). In the absence of peroxide and oxirane groups, the analytical procedures are reliable. Techniques are described for the accurate determination of functional groups when peroxide and oxirane groups are present. A modified procedure for determination of carbonyl oxygen is presented.

380 Morris, Steward G., and Riemenschneider, R. W.
ANTIOXIDANT PROPERTIES OF POLYHYDROXYBENZOIC ACIDS AND THEIR ESTERS, AND OTHER NUCLEAR SUBSTITUTED POLYPHENOLS. Journal of the American Oil Chemists' Society, vol. 26, p. 638-640, November 1949.
This article reports the antioxidant properties of polyhydroxybenzoic acids and their esters, and other nuclear substituted polyphenols as determined by the active oxygen method and by baked cracker tests.

393 Riemenschneider, R. W., Herb, S. F., and Nichols, Peter L., Jr.
ISOLATION OF PURE NATURAL LINOLEIC AND LINOLENIC ACIDS AS THEIR METHYL ESTERS BY ADSORPTION FRACTIONATION ON SILICIC ACID. Journal of the American Oil Chemists' Society, vol. 26, p. 371-374, July 1949.
An effective procedure is described for fractionating methyl esters of oils rich in linoleic and linolenic acids by adsorption of silicic acid columns. Pure methyl linoleate from methyl esters of tobacco seed oil, and pure methyl linolenate from methyl esters of linseed and perilla oils were isolated by this procedure. These compounds were characterized by the usual physical and chemical constants and by spectrophotometric examination. These natural acid esters differed significantly from corresponding debromination acid esters in the intensity of ultraviolet absorption at their maxima under the conditions of the alkali isomerization spectrophotometric method of analysis.

396 Swern, Daniel
ORGANIC PERACIDS. Chemical Reviews, vol. 45, no. 1, p. 1-68, August 1949.
The literature on organic peracids is reviewed, with emphasis on their preparation, properties, and use as oxidizing agents for various classes of organic compounds. Approximately six hundred literature references are included.

397 Swern, Daniel
SOLUBILITY AND SPECIFIC ROTATION OF l-ASCORBYL PALMITATE AND l-ASCORBYL LAURATE. Journal of the American Chemical Society, vol. 71, p. 3256, September 1949.
The solubility of l-ascrobyl palmitate in a series of typical organic solvents, water, and cottonseed and peanut oils was determined. The solubility of l-ascorbyl laurate in these oils, and the specific rotation of both l-ascorbyl palmitate and laurate were also determined.

398 Swern, Daniel, and Billen, Geraldine N.
CHEMISTRY OF EPOXY COMPOUNDS. X. THERMAL POLYMERIZATION OF THE ISOMERIC 9,10-EPOXYOCTADECANOLS. Journal of the American Chemical Society, vol. 71, p. 3849-3851, November 1949.
Thermal polymerization of the isomeric 9,10-epoxyoctadecanols, m.p. 54° and 48° C., respectively, at 60° to 140°, was investigated. Side reactions, of which isomerization of the oxirane group to the carbonyl group was the most important, precluded a kinetic analysis of the polymerization. The average molecular weight of the polymers at zero oxirane oxygen values was about 900, which corresponds to that of a trimer.

399 Swern, Daniel, Stutzman, Jeanne M., and Roe, Edward T.
FATTY ACID AMIDES. II. AMIDES AS DERIVATIVES FOR THE IDENTIFICATION OF SOME LONG-CHAIN UNSATURATED FATTY ACIDS. Journal of the American Chemical Society, vol. 71, p. 3017-3019, September 1949.
N-(2-hydroxyethyl) and N-(n-dodecyl)linoleamides, ricinoleamides, elaidamides and 10-hendecenamides, as well as the unsubstituted amides, elaidamide and 10-hendecenamide, were prepared and characterized. These amides are suitable derivatives for identification of the parent unsaturated acids.

406 Witnauer, Lee P., Nichols, Peter L., Jr., and Senti, Frederic R.
ANALYSES OF MIXTURES OF t,tΔ 9,11- and t,tΔ 10,12-LINOLEIC ACIDS BY X-RAY DIFFRACTION PATTERNS AND SOLIDIFICATION POINTS. Journal of the American Oil Chemists' Society, vol. 26, p. 653-655, November 1949.
A method is reported for analyzing mixtures of t,tΔ 9,11- and t,tΔ 10,12-linoleic acids. X-ray diffraction patterns readily distinguish the pure isomers and identify both components of a binary mixture if it contains not less than 25 percent of the t,tΔ 10,12 isomer and not less than 5 percent of the t,tΔ 9,11-isomer. The solidification points of the acids and their mixtures were determined. The solidification point in conjunction with the X-ray data defines the composition of any mixture to $\pm$ 3 percent.

Patents

July - December

Morris, Steward G., and Riemenschneider, Roy W.
ESTERS OF POLYHYDROXY-BENZOIC ACIDS. U. S. Patent No. 2,483,099, issued September 27, 1949.

Swern, Daniel
ETHERS OF 9,10-DIHYDROXYOCTADECANOL. U. S. Patent No. 2,491,533, issued December 20, 1949.

Swern, Daniel, and Dickel, Geraldine B.
COPOLYMERS OF UNSATURATED ESTERS OF 9,10-DIHYDROXYSTEARIC ACID. U. S. Patent No. 2,475,557, issued July 5, 1949.

Swern, Daniel, Scanlan, John T., and Findley, Thomas W.
HYDROXYLATION PROCESSES. U. S. Patent No. 2,492,201, issued December 27, 1949.

1950

Publications

January - June

409 Ault, Waldo C., and Wells, P. A.
ANIMAL FAT AND OIL RESEARCH. Butchers' Advocate, vol. 127, no. 18, p. 9, 10, and 23, May 3, 1950.
A bref review is presented of the organization of the oil and fat work of the Laboratory and its relation to other research agencies. This is followed by a discussion of the research program and accomplishments of the Eastern Regional Research Laboratory in the field of animal fats.

421 Morris, S. G., Myers, J. S., Jr., Kip, Mary L., and Riemenschneider, R. W.
METAL DEACTIVATION IN LARD. Journal of the American Oil Chemists Society, vol. 27, p. 105-107, March 1950.
A number of compounds, including known synergists, amino acids, and amines, were evaluated as deactivators for copper, iron, nickel and tin in lard. Some were effective as deactivators for copper but were relatively poor for iron. One compound was better for iron than for copper. Ascorbyl palmitate, potassium ascorbyl palmitate, and ascorbic, tartaric, citric and phosphoric acids were the most effective metal deactivators. This deactivation may in part explain the synergistic effect of these compounds with phenolic antioxidants. The more powerful antioxidants, however, are generally poor metal deactivators, and in the presence of traces of metallic pro-oxidants become relatively ineffective unless metal deactivators are also added.

438 Swern, Daniel, and Knight, H. B. (ERRL) and Shreve, O. D., and Heether, M. R. (E. I. Du Pont de Nemours and Company)
COMPARISON OF INFRARED SPECTROPHOTOMETRIC AND LEAD SALT-ALCOHOL METHODS FOR DETERMINATION OF TRANS OCTADECENOIC ACIDS AND ESTERS. Journal of the American Oil Chemists Society, vol. 27, p. 17-21, January 1950.
The infrared spectrophotometric method, previously described by the authors, and the lead salt-alcohol method have been applied to a variety of synthetic mixtures of known composition and to other materials. Comparison of the data indicates that the infrared method is more rapid, specific and accurate than the lead salt-alcohol method. The infrared method is directly applicable to determination of trans isomers in acid or ester mixtures; it requires only small samples and they can be recovered if necessary. This method is suggested as a necessary tool to investigators conducting research on the oxidation, isomerization, polymerization, composition and hydrogenation of fats and their components and derivatives, and on the preparation of pure unsaturated acids and esters.

441 Weil, J. K., Stirton, A. J., and Stawitzke, Anna A.
ALKYL α-ACYLOXYACETATES AND PROPIONATES FROM SOAPS AND α-HALOGENO ESTERS. Journal of the American Oil Chemists Society, vol. 27, p. 187-189, May 1950.

Twenty-six methyl, ethyl and n-butyl α-acyloxyacetates and propionates were prepared, in which the acyl group was derived from undecylenic, lauric, myristic, palmitic, oleic, stearic and phenylstearic acids. The yield,, distillation range, freezing point, refractive index, density, viscosity and viscosity index were recorded. Synthesis by the reaction of a soap with an alkyl α-halogeno ester gave higher yields and greater purity than acylation by acid chlorides. Conditions for the reaction were complete dryness of the reactants, absence of free acid in the alkyl α-halogeno ester, and reaction temperatures of 150-170°. Since most of the alkyl α-acyloxyacetates and propionates appeared to be compatible with ethyl cellulose and polyvinyl chloride, they will be evaluated as plasticizers.

Publications

July - December

458 Ault, Waldo C., Wells, P. A., and Stirton, A. J.
PROGRESS OF GOVERNMENT RESEARCH ON ANIMAL FATS. Proceedings of the Twenty-Third Annual Convention Soap and Glycerine Industry, held in New York City, January 1950.

The work of the Oil and Fat Division at the Eastern Regional Research Laboratory is discussed, with special emphasis on the work of the Surface Active Agent Section. Past accomplishments of this group are reviewed, and a general discussion of our present research program in this field is presented.

477 Knight, H. B., Koos, R. E., Jordan, E. F., Jr., and Swern, Daniel
COMPATIBILITY OF DERIVATIVES OF 9,10-DIHYDROXYSTEARIC ACID AND 9,10-DIHYDROXYOCTADECANOL WITH SOME COMMERCIAL POLYMERS. Journal of the American Oil Chemists' Society, vol. 27, p. 281-284, July 1950.

A study of compatibility with some commercial polymers is reported for some alkyl and alkenyl esters of low-melting 9,10-dihydroxystearic acid, 9,10-(10,9)-alkoxyhydroxyoctadecanols, esters of 9,10-(10,9)-alkoxyhydroxystearic acids, and two series of previously unreported compounds, namely, esters of the isomeric 9,10-dihydroxystearic acids with ether-alcohols and polymeric plasticizers prepared by the reaction of selected members of this group of new esters with phthalic anhydride. The most promising materials are methyl 9,10-(10,9)-methoxyhydroxystearate, esters of 9,10-dihydroxystearic acid with ethylene glycol monobutyl ether and ethylene glycol monobenzyl ether, and the polymeric plasticizers. The last-named group is compatible with polymers which differ widely in chemical structure.

483 Nichols, Peter L., Jr., Riemenschneider, R. W., and Herb, S. F.
KINETICS OF ALKALI ISOMERIZATION OF LINOLEIC, LINOLENIC, AND ARACHIDONIC ACIDS. Journal of the American Oil Chemists' Society, vol. 27, p. 329-336, September 1950.
A theory of alkali isomerization of linoleic, linolenic, and arachidonic acids is presented in which systematic classification of concurrent prototropic changes is introduced. The limited experimental data available are correlated.

498 Roe, Edward T., and Swern, Daniel
DETERMINATION OF LONG-CHAIN HYDROXAMIC ACIDS. Analytical Chemistry, vol. 22, p. 1160-1162, September 1950.
A procedure is described for determining long-chain hydroxamic acids. It consists in hydrolysis to carboxylic acid and hydroxylamine hydrochloride with a known excess of aqueous, alcoholic hydrochloric acid, followed by titration of either the excess hydrochloric acid or the hydroxylamine hydrochloride formed. The former technique gives slightly low results; the latter, slightly high results. Hydroxylamine hydrochloride cannot be titrated, however, in the presence of fatty acids containing ten or fewer carbon atoms.

500 Shreve, O. D., and Heether, M. R., (Philadelphia Laboratory of E. I. Dupont de Nemours and Company), Knight, H. B., and Swern, Daniel (ERRL).
DETERMINATION OF TRANS-OCTADECENOIC ACIDS, ESTERS AND ALCOHOLS IN MIXTURES. Analytical Chemistry, vol. 22, p. 1261-1263, October 1950.
An infrared spectrophotometric method, based on differences in absorption at 10.36 microns, is described for determination of trans octadecenoic acids, esters (including glycerides), and alsohols in the presence of the corresponding cis and saturated compounds. Extinction coefficients at 10.36 microns are reported for seventeen pure cis and trans monounsaturated and saturated acids, esters, and alcohol.

501 Shreve, O. D., and Heether, M. R. (Philadelphia Laboratory of E. I. Dupont de Nemours and Company), Knight, H. B., and Swern, Daniel (ERRL).
INFRARED ABSORPTION SPECTRA. SOME LONG-CHAIN FATTY ACIDS, ESTERS AND ALCOHOLS. Analytical Chemistry, vol. 22, p. 1498-1501, December 1950.
Infrared absorption spectra from 2 to 15 microns have been presented for a number of pure, long-chain, saturated and monounsaturated fatty acids, methyl esters, tri-glycerides, and alcohols. Correlations of absorption bands with molecular structure have been given for all spectra. The spectra should be useful in the application of the infrared method to studies involving fats and otherlong-chain systems.

503 Swern, Daniel, and Findley, Thomas W.
CHEMISTRY OF EPOXY COMPOUNDS. XII. COOXIDATION OF ALDEHYDES AND OLEIC ACID, METHYL OLEATE OR OLEYL ALCOHOL. Journal of the American Chemical Society, vol. 72, p. 4315-4316, September 1950.
Cooxidation of benzaldehyde, acetaldehyde or butyraldehyde and oleic acid, methyl oleate or oleyl alcohol with air in the presence of ultraviolet light was studied. Yields of 9,10-epoxy compounds of 15-40 percent were obtained.

504 Swern, Daniel, and Jordan, E. F., Jr.
VINYL LAURATE AND OTHER VINYL ESTERS. Organic Syntheses, vol. 39, p. 106-109. 1950.
Laboratory procedures for the preparation of vinyl laurate, caproate, caprylate, pelargonate, caprate, myristate, palmitate, stearate, 10-hendecenoate (undecylenate), and oleate are described.

510 Witnauer, Lee P. and Swern, Daniel.
X-RAY DIFFRACTION AND MELTING POINT-COMPOSITION STUDIES ON THE 9,10-EPOXY- AND DIHYDROXYSTEARIC ACIDS AND 9,10-EPOXYOCTADECANOLS. Journal of the American Chemical Society, vol. 72, p. 3364-3368, August 1950.
X-ray diffraction and melting point-composition data are reported for the isomeric 9,10-epoxy- and dihydroxystearic acids and the isomeric 9,10-epoxyoctadecanols. The geometric configuration of the isomeric 9,10-epoxyoctadecanols has been established from a study of the x-ray diffraction data. By analogy, the configuration of the isomeric 9,10-epoxystearic acids has also been established. Melting point-composition data can be employed to analyze binary mixtures of the isomeric 9,10-epoxyoctadecanols and epoxystearic acids with an accuracy of ± 1 percent by weight. Corresponding data for the isomeric 9,10-dihydroxystearic acids are of little value in analysis. The composition of such mixtures, however, can be determined to ± 3 percent from the x-ray powder patterns.

Patents

July - December

Swern, Daniel
COPOLYMERS OF UNSATURATED ETHERS. U. S. Patent No. 2,516,928, issued August 1, 1950.

Swern, Daniel, and Dickel, Geraldine B.
ESTERS OF OLEIC ACID WITH UNSATURATED ALCOHOLS. U. S. Patent No. 2,527,597, issued October 31, 1950.

1951

Publications

January - June

511 Ault, Waldo C.
POTENTIAL NEW USES FOR ANIMAL FATS. American Meat Institute. Proceedings of the Third Conference on Research, p. 87-91, 1951.
New outlets for inedible animal fats that offer the greatest potential rewards are discussed.

514 Brice, B. A., Ricciuti, C., Willits, C. O., Swain, M. L., and Ault, W. C.
RELATIONSHIP BETWEEN NICKEL CONTENT OF SOAP AND CONVERSION TO POLYMER IN MANUFACTURE OF SYNTHETIC RUBBER (GR-S). Journal of the American Oil Chemists Society, vol. 28, p. 85-87, March 1951.
A number of soaps from hydrogenated fat stocks, representing soaps having good and bad characteristics as emulsifiers in plant production of GR-S, were analyzed for nickel, copper, and iron. A statistical study of the data on polymerization and on metal content indicated that variability in conversion was caused by variations in the metal content of the soap.

525 Herb, S. F., Riemenschneider, R. W., and Donaldson, Jeanette
ISOLATION OF NATURAL ARACHIDONIC ACID AS ITS METHYL ESTER. Journal of the American Oil Chemists Society, vol. 28, p. 55-58, February 1951.
Methyl arachidonate has been isolated in a high degree of purity from beef suprarenal glands. The method consisted in chromatographing on silicic acid followed by fractional distillation, thus avoiding possible formation of isomers by chemical action. The ester has been used in establishing standards for spectrophotometric analysis.

527 Knight, H. B., Eddy, C. Roland, and Swern, Daniel
REACTIONS OF FATTY MATERIALS WITH OXYGEN. VIII. CIS-TRANS ISOMERIZATION DURING AUTOXIDATION OF METHYL OLEATE. Journal of the American Oil Chemists Society, vol. 28, p. 188-192, May 1951.
Methyl oleate, irradiated with ultraviolet, has been autoxidized at 35°, 70°, and 100°C. for 2000, 264 and 168 hours, respectively. Samples were withdrawn at intervals and total oxygen introduced was determined by chemical analysis for peroxide, carbonyl, hydroxyl, oxirane, ester and carboxyl oxygen. Even with such a comparatively simple substrate as methyl oleate, the autoxidation reaction is exceedingly complex.

530 Nichols, Peter L., Jr., Herb, S. F., and Riemenschneider, R. W.
ISOMERS OF CONJUGATED FATTY ACIDS. I. ALKALI-ISOMERIZED LINOLEIC ACID. Journal of the American Chemical Society, vol. 73, p. 247-252, January 1951.
Considerable change in composition and properties of alkali-isomerized linoleic acid was effected by mild treatment with iodine. Identification of the main product formed with an equal mixture of 9,11 linoleic acid and 10,12 linoleic acid shed further light on the constitution of alkali-isomerized linoleic acid.

538 Shreve, O. D., Heether, M. R. (E. I. duPont de Nemours and Co.), Knight, H. B., and Swern, Daniel (ERRL).
INFRARED ABSORPTION SPECTRA OF SOME HYDROPEROXIDES, PEROXIDES AND RELATED COMPOUNDS. Analytical Chemistry, vol. 23, p. 282-285, February 1951.
Infrared absorption spectra of a series of pure hydroperoxides, peroxides and related compounds from 2 to 15 microns were obtained and interpreted. On the basis of empirical analyses of the spectra of the hydroperoxides and their parent compounds, it was tentatively concluded that the hydroperoxide group gives rise to a characteristic absorption band near 12 microns. Study of the spectra of the peroxides, and additional peroxide spectra included in a commercially available catalogue of spectra, indicates that the peroxide linkage probably causes a strong absorption band in the 10 to 12 micron region but that the frequency corresponding to this band is sensitive to changes in the structure of the groups attached to the peroxide linkage.

539 Shreve, O. D., Heether, M. R. (E. I. duPont de Nemours and Co.), Knight, H. B. and Swern, Daniel (ERRL).
INFRARED ABSORPTION SPECTRA OF SOME EPOXY COMPOUNDS. Analytical Chemistry, vol. 23, p. 277-282, February 1951.
Infrared spectra from 2 to 15 microns, with absorption maxima, are presented for 16 epoxy compounds including: (a) 3 oxirane derivatives of long-chain hydrocarbons, (b) 4 oxirane derivatives of lower molecular weight compounds; (c) oxirane derivatives of long-chain fatty acids, esters and alcohols, and (d) 3 epoxy compounds containing 5- and 6-membered rings. The spectra are discussed, and certain conclusions given.

Patents

January - June

Swern, Daniel
ETHER-ESTERS OF DIHYDROXYSTEARIC ACID. U. S. Patent No. 2,542,062, issued February 20, 1951.

Swern, Daniel, and Jordan, Edmund F., Jr.
UNSATURATED ESTERS OF 10-HENDECENOIC ACID. U. S. Patent No. 2,541,126, issued February 13, 1951.

1951

Publications

July - December

550 Ault, Waldo C.
ANIMAL FATS AND OILS AS INDUSTRIAL RAW MATERIALS. Chemurgic Digest, vol. 10, p. 4-6, September 1951.
Animal fats and oils are discussed from the viewpoint of their use as industrial raw materials. Changes appearing in the pattern of their use are described, and new uses offering considerable promise for increasing and broadening the utilization of fats and their derivatives are pointed out.

551 Ault, Waldo C., Riemenschneider, Roy W., and Morris, Steward G.
MEAT FATS OF BETTER QUALITY. Crops in Peace and War, Yearbook of Agriculture 1950-1951, p. 671-676.
Discusses ways and means for production and processing of meat fats, particularly lard, having properties desired by American housewives.

558 Cording, James, Jr., and Shaines, Alfred
PREPILOT PLANT METHOD FOR CRYSTALLIZING FATS AND GREASES IN DRUMS. Journal of the American Oil Chemists' Society, vol. 28, p. 344-346, August 1951.
A method is described for the batch fractional crystallization of wool grease or fatty acids from solvents at reduced temperature, in which the 55-gallon drum is employed as a blender and crystallizer. The method is illustrative of prepilot plant operations for producing quantities of new products for industrial evaluation.

571 Herb, S. F., Witnauer, Lee P., and Riemenschneider, R. W.
ISOLATION OF EICOSAPENTAENOIC AND DOCOSAPENTAENOIC ACIDS FROM NATURAL SOURCES AS THEIR METHYL ESTERS BY ADSORPTION AND DISTILLATION TECHNIQUES. Journal of the American Oil Chemists' Society, vol. 28, p. 505-507, December 1951.
Methyl eicosapentaenoate and docosapentaenoate were isolated by adsorption and distillation techniques from the highly unsaturated esters of beef adrenal lipids. Specific extinction coefficients were determined under two conditions of alkali isomerization.

577 Knight, H. B., Coleman, Joseph E., and Swern, Daniel
REACTIONS OF FATTY MATERIALS WITH OXYGEN. IX. ANALYTICAL STUDY OF THE AUTOXIDATION OF METHYL OLEATE. Journal of the American Oil Chemists' Society, vol. 28, p. 498-501, December 1951.
Methyl oleate, irradiated with ultraviolet, was autoxidized at 35°, 70° and 100°C. for 2000, 264 and 168 hours, respectively. Samples were withdrawn at intervals, and total oxygen introduced was determined by chemical analysis for peroxide, carbonyl, hydroxyl, oxirane, ester and carboxyl oxygen. Even with such a comparatively simple substrate as methyl oleate, the autoxidation reaction is exceedingly complex.

588 Port, William S., Hansen, John E., Jordan, E. F., Jr., Dietz, T. J., and Swern, Daniel.
POLYMERIZABLE DERIVATIVES OF LONG-CHAIN FATTY ACIDS. IV. VINYL ESTERS. Journal of Polymer Science, vol. 7, p. 207-220, August-September 1951.
Contrary to some literature reports, the vinyl esters of saturated fatty acids polymerize readily and rapidly. Vinyl oleate, when present in excess of 5 percent, and oxygen exert marked retarding effects. Techniques are described for the free-radical initiated polymerization of the vinyl esters of caprylic, capric, lauric, myristic, palmitic and stearic acids in bulk, dispersion, solution, and emulsion. Some data are given for polymerization in the presence of chain-transfer agents, such as carbon tetrachloride, dodecylmercaptan and ethylbenzene. Conditions are reported for obtaining degrees of polymerization from about 2 (when chain-transfer agents are employed) to 10,000 (weight average). The weight average degree of polymerization increases markedly as the conversion increases, particularly above 80 percent. Even up to extremely high conversions, soluble polymers are obtained in most cases. Solubility characteristics, transition point data, molecular weights (osmometric and light-scattering), and isolation and purification techniques are also reported.

589 Port, William S., O'Brien, James W., Hansen, John E., and Swern, Daniel
VISCOSITY INDEX IMPROVERS FOR LUBRICATING OILS. POLYVINYL ESTERS OF LONG-CHAIN FATTY ACIDS. Industrial and Engineering Chemistry, vol. 43, p. 2105-2107, September 1951.
Polyvinyl palmitate, polyvinyl caprylate, and copolymers of vinyl palmitate with vinyl acetate are effective viscosity index improvers for lubricating oils. The improvement in viscosity index caused by the copolymers increases with increased vinyl acetate content.

591 Roe, Edward T., Stutzman, Jeanne M., and Swern, Daniel
FATTY ACID AMIDES. III. N-ALKENYL AND N,N-DIALKENYL AMIDES. Journal of the American Chemical Society, vol. 73, p. 3642-3643, August 1951.
Fifteen N-alkenyl and N,N-dialkenyl amides have been prepared in good yield from allylamine, diallylamine, methyallylamine and dimethyallylamine and caprylic, capric, lauric, myristic, stearic and oleic acids. Several of the amides, notably those of myristic and stearic acids, are excellent derivatives for the characterization of the unsaturated amines. Data are reported on the sulfation and polymerization of certain of these amides.

593 Scanlan, John T.
SOME GOODS FROM WOOL GREASE. Crops in Peace and War. Yearbook of Agriculture 1950-1951, p. 863-868.
Several methods for recovery of wool grease are discussed. Uses for the recovered grease are outlined, and present knowledge regarding its chemical composition is reviewed. It is emphasized that additional information along composition lines is needed for substantially increased utilization.

597 Swern, Daniel, Ault, Waldo C., and Stirton, A. J.
ANIMAL FATS AND OILS IN INDUSTRY. Crops in Peace and War. Yearbook of Agriculture 1950-1951, p. 538-543.
Utilization of inedible animal fats for industrial purposes is discussed. An outline of present commercial uses for these fats is presented, and suggestions are given for development of new products having greater possible outlets.

Patents

July - December

Findley, Thomas W., and Swern, Daniel
PREPARATION OF EPOXY COMPOUNDS BY OXIDATION OF CIS-MONOOLEFINE COMPOUNDS. U. S. Patent No. 2,567,930, issued September 18, 1951.

Scanlan, John T., Swern, Daniel, and Roe, Edward T.
AMIDES OF 9,10-EPOXYSTEARIC ACID. U. S. Patent No. 2,567,237, issued September 11, 1951.

Swern, Daniel, and Findley, Thomas W.
EPOXIDIZED OILS. U. S. Patent No. 2,569,502, issued October 2, 1951.

Swern, Daniel, Jordan, Edmund F., Jr., and Port, William S.
EMULSION POLYMERIZATION OF LONG-CHAIN VINYL ESTERS. U. S. Patent No. 2,562,965, issued August 7, 1951.

Swern, Daniel, and Knight, Hogan B.
OXIDATION OF OLEIC ACID. U. S. Patent No. 2,572,892, issued October 30, 1951.

1952

Publications

January - June

629 Knight, H. B., Jordan, E. F., Jr., Roe, Edward T., and Swern, Daniel.
OLEIC ACID AND METHYL OLEATE. Biochemical Preparations, vol. 2, p. 100-104 (1952).
Large-scale laboratory procedures suitable for use in the preparation of pure oleic acid and methyl oleate are described.

636 Nichols, Peter L., Jr.
COORDINATION OF SILVER ION WITH METHYL ESTERS OF OLEIC AND ELAIDIC ACIDS. Journal of the American Chemical Society, vol. 74, p. 1091-1092, February 20, 1952.
The distribution of methyl oleate and methyl elaidate between isooctane and a solution of silver nitrate in aqueous methanol was measured. Coordination of silver ion with the cis-isomer was considerably greater, but only repeated extraction of isooctane-olefin solutions with silver nitrate could effect complete separation of the oleate and elaidate from a mixture. The possibility is envisioned of separating polyunsaturated fatty acid esters and of separating and classifying mixed glycerides with various degrees of unsaturation by an analogous process.

645 Riemenschneider, Roy W.
MEAT FATS FOR FRYING POTATO CHIPS. Potato Chipper, vol. 11, no. 11, p. 42-46, June 1952.
Results of recent investigations on the use of antioxidants in meat fats and blends of meat fats and vegetable fats for drying potato chips are summarized.

646 Roe, Edward T., Stutzman, Jeanne M., Scanlan, John T., and Swern, Daniel.
FATTY ACID AMIDES. IV. REACTION OF FATS WITH AMMONIA AND AMINES. Journal of the American Oil Chemists' Society, vol. 29, p. 18-22, January 1952.
Conditions were worked out for the quantitative conversion of oleo oil, olive oil, castor oil, and tobacco seed oil to amides and glycerol by reaction with liquid ammonia under pressure. Similarly, methyl oleate was converted to oleamide in excellent yield. N-(2-hydroxyethyl)- and N-(n-dodecyl) amides were also prepared by the reaction of oleo oil with monoethanolamine and n-dodecylamine, respectively, at atmospheric pressure. Crystallization of the amides obtained from the various fats yielded oleamide (purity, 92 percent) from olive oil, ricinoleamide (purity, >95 percent) from castor oil, and N-(2-hydroxyethyl) oleamide (purity, 90 percent) from oleo oil.

649 Stirton, A. J., Weil, J. K., Stawitzke, Anna A., and James, S.
SYNTHETIC DETERGENTS FROM ANIMAL FATS. DISODIUM ALPHA-SULFOPALMITATE AND SODIUM OLEYL SULFATE. Journal of the American Oil Chemists' Society, vol. 29, p. 198-201, May 1952.
Disodium alpha-sulfopalmitate prepared by the sulfonation of palmitic acid with liquid sulfur trioxide is potentially inexpensive, has adequate surface active properties, is a good detergent in hard and soft water, but has limited solubility at room temperature (0.25 percent at 25° C.). Sodium oleyl sulfate prepared by sulfation of oleyl alcohol with pyridine-sulfur trioxide has excellent solubility and surface active properties and is an excellent detergent in soft water. In hard water it is not so efficient, although it forms no insoluble calcium salts. The future of these compounds will depend on successful formulation with builders or combinations with soap or other detergents.

650 Swern, Daniel, and Jordan, E. F., Jr.
METHYL RICINOLEATE. Biochemical Preparations, vol. 2, p. 104-105 (1952).
A large-scale laboratory procedure suitable for use in preparing pure methyl ricinoleate is described.

651 Swern, Daniel, Knight, H. B., and Eddy, C. Roland.
TRANS-OCTADECENOIC ACID CONTENT OF BEEF FAT. ISOLATION OF ELAIDIC ACID FROM OLEO OIL. Journal of the American Oil Chemists' Society, vol. 29, p. 44-46, February 1952.
Infrared spectrophotometric examination of three samples of freshly rendered edible beef fat, and edible oleo oil and oleo stearine obtained from one of them, revealed the presence of substantial quantities (5 to 10 percent) of trans materials believed to be mainly, if not exclusively, monounsaturated. It was concluded that the trans components are neither minor nor adventitious constituents, but important naturally occurring components which may contribute to any unique properties that beef fat may have. Trans-9-octadecenoic (elaidic) and vaccenic acids were isolated from oleo oil, the former apparently for the first time.

652 Swern, Daniel, and Port, William S.
POLYMERIZABLE DERIVATIVES OF LONG-CHAIN FATTY ACIDS. VI. PREPARATION AND APPLICABILITY OF UREA COMPLEXES OF VINYL ESTERS. Journal of the American Chemical Society, vol. 74, p. 1738-1739, April 5, 1952.
Vinyl esters of long-chain fatty acids, such as vinyl pelargonate, laurate, palmitate, and stearate, form urea complexes in good to excellent yield (56 to 99 percent). The technique of urea complex formation was used to separate vinyl pelargonate from cross-linking contaminants and to recover monomeric vinyl palmitate from mixtures containing monomer, polymer, inhibitor, and other unknown impurities.

653 Swern, Daniel, Witnauer, Lee P., and Knight, H. B.
CHEMISTRY OF EPOXY COMPOUNDS. XIII. UREA COMPLEX FORMATION IN DETERMINING THE CONFIGURATIONS OF THE 9,10-DIHYDROXYSTEARIC ACIDS. Journal of the American Chemical Society, vol. 74, p. 1655-1657, April 5, 1952.
It was shown that the hydroxyl groups in the high-melting isomer are on opposite sides of the chain, whereas in the low-melting isomer they are substantially on the same side. This information confirms the fact that hydroxylation with potassium permanganate proceeds by cis or normal addition and that opening of the oxirane ring of the isomeric 9,10-epoxystearic acids involves an inversion.

Patents

January - June

Ault, Waldo C., Nutting, George C., and Weil, James K.
ESTERS OF POLYHYDROXY-BENZOIC ACIDS AND METHOD FOR THEIR PREPARATION. U. S. Patent No. 2,595,221, issued May 6, 1952.

Port, William S., Jordan, Edmund F., Jr., and Swern, Daniel
SEPARATION OF VINYL ESTERS OF LONG CHAIN FATTY ACIDS FROM THE CORRESPONDING FREE FATTY ACIDS. U. S. Patent No. 2,586,860, issued February 26, 1952.

Publications

January - June

661 Willits, C. O., Ricciuti, Constantine, Knight, H. B., and Swern, Daniel.
POLAROGRAPHIC STUDIES OF OXYGEN-CONTAINING ORGANIC COMPOUNDS. FUNCTIONAL GROUPS OF AUTOXIDATION PRODUCTS. Analytical Chemistry, vol. 24, p. 785-790, May 1952.
Describes the polarographic characteristics of a large variety of pure organic oxygen-containing compounds, suspected as products of autoxidation. The polarographic characteristics of these compounds will serve as an aid in the qualitative and quantitative analyses of autoxidation products.

Publications

July - December

666 Brice, B. A., Swain, M. L., Herb, S. F., Nichols, P. L., Jr., and Riemenschneider, R. W.
STANDARDIZATION OF SPECTROPHOTOMETRIC METHODS FOR DETERMINATION OF POLYUNSATURATED FATTY ACIDS USING PURE NATURAL ACIDS. The Journal of the American Oil Chemists' Society, vol. 29, no. 7, p. 279-287, July 1952.
Spectrophotometric methods of analysis of natural fats and oils have been restandardized for several conditions of alkali-isomerization using purified methyl esters of linoleic, linolenic, and arachidonic acids prepared by physical rather than chemical means. Application of the revised methods to a wide selection of oils and fats shows substantially higher accuracy than was obtained using standards prepared by debromination procedures.

668 Coleman, J. E., Knight, H. B., and Swern, Daniel.
REACTIONS OF FATTY MATERIALS WITH OXYGEN. XII. NEW METHOD FOR CONCENTRATING LONG-CHAIN PEROXIDES. Journal of the American Chemical Society, vol. 74, p. 4886-4889, October 1952.
By precipitation of the non-peroxidic portion of methyl oleate autoxidation mixtures (containing 4-37% peroxides) as urea complexes, concentrates containing 70-90% peroxides have been isolated from the filtrate in 50-95% yields. The three isolation techniques developed are applicable on a large laboratory scale, no specialized equipment or chemicals are required, temperatures in the range of room temperature to the boiling point of methanol are employed, and the procedures are readily duplicated. A preliminary study has indicated that the new techniques are applicable to the concentration of peroxides from autoxidized methyl elaidate and polyunsaturated acids.

674 Herb, S. F., and Riemenschneider, R. W.
INFLUENCE OF ALKALI CONCENTRATION AND OTHER FACTORS ON THE CONJUGATION OF NATURAL POLYUNSATURATED ACIDS AS DETERMINED BY ULTRAVIOLET ABSORPTION MEASUREMENTS. Journal of the American Oil Chemists' Society, vol. 29, p. 456-461, November 1952.
Optimum conditions for production of maximum conjugation of methyl arachidonate were determined. These comprise heating the sample in 21 percent KOH glycol for 15 minutes at 180°C. Optimum conditions of isomerization have also been applied to methyl linoleate, methyl linolenate, methyl eicosapentaenoate, and docosapentaenoate, which were prepared by physical methods. These conditions greatly increased the sensitivity of the spectrophotometric method for all the polyunsaturated acids except linoleic, for which the sensitivity was unchanged.

678 Knight, H. B., Witnauer, L. P., Coleman, J. E., Noble, W. R., Jr., and Swern, Daniel.
DISSOCIATION TEMPERATURES OF UREA COMPLEXES OF LONG-CHAIN FATTY ACIDS, ESTERS AND ALCOHOLS. A NEW CHARACTERIZATION TECHNIQUE. Analytical Chemistry, vol. 24, p. 1331-1334, August 1952.
Urea complexes have been prepared in high yield from forty-two long-chain fatty acids, methyl and vinyl esters, and alcohols, a mono- and diglyceride and a vinyl ether. These include several cis-trans pairs and some long-chain compounds with oxygen-containing functional groups in the chain. With only a few exceptions, the dissociation temperature of each of these complexes has been determined. The dissociation temperature, which is the temperature at which opacity first occurs when a transparent crystal of urea complex is slowly heated, is characteristic for each complex and can be readily duplicated ($\pm$ 1.5°).

681 Morris, S. G., Gordon, C. F., Brenner, N., Myers, J. S., Jr., Riemenschneider, R. W., and Ault, W. C.
FRACTIONATION OF ANIMAL FAT GLYCERIDES BY CRYSTALLIZATION FROM ACETONE. AN IMPROVED LARD OIL. Journal of the American Oil Chemists' Society, vol. 29, p. 441-443, November 1952.
Conditions have been investigated for separating various edible and inedible grades of animal fats, such as lard, grease, tallow and selectively hydrogenated greases and tallows into "oils" and "stearins" by means of crystallization from acetone.

686 Port, William S., Jordan, E. F., Jr., Hansen, John E., and Swern, Daniel.
POLYMERIZABLE DERIVATIVES OF LONG-CHAIN FATTY ACIDS. VII. COPOLYMERIZATION OF VINYL ACETATE WITH SOME LONG-CHAIN VINYL ESTERS. Journal of Polymer Science, vol. 9, p. 493-502, December 1952.
A study was made of the copolymerization of vinyl acetate with vinyl palmitate, vinyl stearate, and vinyl oleate, respectively. The first-order transition temperatures and the brittle points of the copolymers were measured. The monomer reactivity ratios for the system vinyl acetate-vinyl palmitate were determined by two methods.

691 Roe, E. T., Miles, T. D. and Swern, Daniel.
FATTY ACID AMIDES. V. PREPARATION OF N-(2-ACETOXYETHYL)-AMIDES OF ALIPHATIC ACIDS. Journal of the American Chemical Society, vol. 74, p. 3442-3443, July 1952.
A general method is described for the preparation in high yield of N-(2-acetoxyethyl)-amides from N-(2-hydroxyethyl)-amides by reaction with acetic anhydride.

696 Schweigert, B. S., Siedler, A. J., Dugan, L. R., Jr., and Neumer, J. F. (American Meat Institute Foundation).
USE OF INEDIBLE FATS IN DRY DOG FOODS AND POULTRY RATIONS. A.M.I.F. Bulletin No. 15, October 1952.
Nutritional investigations showed that growth rate and food utilization of dogs and broilers fed typical commercial rations, to which choice white grease was added at different levels up to 8 percent, was equal to, or slightly superior to, those observed when the control basal ration was fed. Antioxidants incorporated in the fats that were added to the rations, was shown to be of value in retarding the loss of vitamin A in the feeds during the storage.

699 Stirton, A. J.
RAW MATERIALS FOR SOAP. SATURATED AND UNSATURATED FATS. Journal of the American Oil Chemists' Society, vol. 29, p. 482-485, November 1952.
A review of the composition of the animal fats, lauric acid oils, vegetable oil foots and hydrogenated marine oils used in soap making, and the necessity for blending the raw materials.

700 Swern, Daniel, and Findley, Thomas W.
CHEMISTRY OF EPOXY COMPOUNDS. XIV. REACTION OF CIS-9,10-EPOXYSTEARIC ACID WITH AMMONIA AND AMINES. Journal of the American Chemical Society, vol. 74, p. 6129-6141, December 5, 1952.
The reaction of cis-9,10-epoxystearic acid, m.p. 59.5°, with ammonia, methylamine, ethylamine, dimethylamine, diethylamine, and aniline was studied. The oxirane ring was readily opened, and unsubstituted or substituted aminohydroxystearic acids were obtained. Some of the substituted products showed surface activity.

701 Swern, Daniel, and Parker, Winfred E.
APPLICATION OF UREA COMPLEXES IN THE PURIFICATION OF FATTY ACIDS, ESTERS, AND ALCOHOLS. I. OLEIC ACID FROM INEDIBLE ANIMAL FATS. Journal of the American Oil Chemists' Society, vol. 29, p. 431-434, October 1952.
Urea complex formation was employed in the preparation of purified oleic acid (oleic acid content, 80-95 percent) from various grades of inedible animal fats and red oils. Since the urea complex of oleic acid forms in good yield at room temperature, low temperatures were not required in the isolation procedure.

702 Swern, Daniel and Parker, Winfred E.
APPLICATION OF UREA COMPLEXES IN THE PURIFICATION OF FATTY ACIDS, ESTERS, AND ALCOHOLS. II. OLEIC ACID AND METHYL OLEATE FROM OLIVE OIL. Journal of the American Oil Chemists' Society, vol. 29, p. 614-615, December 1952.
Oleic acid and methyl oleate of high purity (97-99 percent) and substantially free (0.2 percent or less) of polyunsaturated contaminants were isolated in 60-70 percent yields from the fatty acids or methyl esters of olive oil by procedures that required only one precipitation of urea complexes (single dose of urea technique), one low-temperature crystallization, and one fractional distillation. The urea complex separation technique can be applied directly to olive oil methanolysis reaction mixtures without prior isolation of the mixed methyl esters.

Patents

July - December

Swern, Daniel, Roe, E. T., and Scanlan, J. T.
AMIDES OF 9,10-DIHYDROXYSTEARIC ACID. U. S. Patent No. 2,605,270 issued July 29, 1952.

Roe, E. T. and Swern, Daniel
METHOD OF PRODUCING AMIDES. U. S. Patent No. 2,608,562 issued August 26, 1952.

Knight, H. B.
POLYMERIC PLASTICIZERS. U. S. Patent No. 2,613,157 issued October 7, 1952.

1953

Publications

January - June

716 Ault, Waldo C.
RECENT ADVANCES IN UTILIZATION OF ANIMAL FATS. American Meat Institute Proceedings of the Fifth Research Conference on Research, p. 18-25, 1953.
The economic and technological background of the animal fat industry is briefly presented. Examples are cited to show that research offers considerable promise for eventually improving the present unhappy status of animal fats. Problems concerned with animal fat utilization now being investigated at the Eastern Regional Research Laboratory are outlined and briefly discussed. Some developments of private industry are also discussed.

717 Ault, Waldo C., and Riemenschneider, R. W.
ADVANCED FOOD PROCESSING WITH IMPROVED FATS AND OILS. I. FACTORS IN LARD'S COMEBACK. Food Engineering, vol. 25, p. 99-100, June 1953.
Various factors are noted that point to an increasing use of animal fats, particularly lard, as shortening. The principal factors involved are undoubtedly the lower price of lard and the recently developed technological means for improving it.

723 Cording, James Jr., Willard, Miles J. Jr., Edwards, Paul W., and Eskew, Roderick K.
LOW-TEMPERATURE SOLVENT FRACTIONATION OF ANIMAL FATS. PART I. EVALUATION OF ANHYDROUS SOLVENTS FOR CRYSTALLIZATION OF WHITE GREASE. Journal of the American Oil Chemists' Society, vol. 30, p. 66-70, February 1953.
Compares five selected solvents as media for fractionating white grease by low-temperature crystallization. Yields of the liquid fractions (lard oil) obtained by crystallizing at temperatures in the range of about 20 to 45°F. are plotted against quality (as indicated by titer) for each solvent. Preliminary data are given that show the effects of variables other than crystallization temperature which influence the yield and quality of the liquid fraction.

724 Cording, James Jr., Willard, Miles J. Jr., Edwards, Paul W., and Eskew, Roderick K.
LOW-TEMPERATURE SOLVENT FRACTIONATION OF ANIMAL FATS. II. EVALUATION OF WATER-SATURATED SOLVENTS FOR CRYSTALLIZATION OF WHITE GREASE. Journal of the American Oil Chemists' Society, vol. 30, p. 111-113, March 1953.
Presents data on the effect of crystallization temperature on yields and constants of liquid and solid fractions obtained by crystallization of white grease from four selected solvents, water-saturated. These data are compared with similar data, published earlier by the same authors, evaluating the same solvents, anhydrous.

730 Fochtman, E. G., Kinney, L. C., and Ference, G. G. (Armour Research Foundation of Illinois Institute of Technology), and Riemenschneider, R. W., Morris, S. G., and Ault, W. C. (ERRL). (Work done under Research and Marketing Act Contract).
ANIMAL FATS IN HOT DIP TINNING. AIC-354, April 1953. (Processed.)
Laboratory evaluation tests were conducted on a series of industrial animal fats, such as white grease, tallow, and lard, and these industrial fats modified by well-known processing treatments for potential use in hot-dip tinning of steel sheets. The results indicated that the better grades of these animal fats with appropriate treatment could successfully replace palm oil in the tinning operation.

A choice white grease, selectively hydrogenated, deodorized, and stabilized with antioxidant, was given a full-scale plant evaluation in hot-dip tinning. Its performance in tinning, as judged by the plant personnel and by operational data, was equal to palm oil in every respect and better in some respects.

733 Herb, S. F., and Riemenschneider, R. W.
SPECTROPHOTOMETRIC MICROMETHOD FOR DETERMINING POLYUNSATURATED FATTY ACIDS. Analytical Chemistry, vol. 25, p.953-955, June 1953.
A spectrophotometric micromethod was developed for determining polyunsaturated acids. This method, based on isomerization with 21 percent KOH-glycol, gives reproducible results on samples of 1 to 10 mg. comparable with those obtained by macromethods. Constants for use in the method are available for linoleic, linolenic, arachidonic, and pentaenoic acids. The most important application of the method should be in biological and medical research when only a few milligrams of sample are available for analyses.

746 Neumer, John F., and Dugan, L. R., Jr. (American Meat Institute Foundation; work done under Research and Marketing Act Contract)
THE USE OF ANTIOXIDANTS IN DRY DOG FOOD. Food Technology, vol. 7, p. 189-191, May 1953.
The effectiveness of various antioxidants in stabilizing mixes of a dry dog food with inedible grade animal fats was investigated. Certain antioxidants of the hindered phenolic types were most effective.

747 Neumer, John F., and Dugan, L. R. Jr. (American Meat Institute Foundation; work done under Research and Marketing Act Contract)
A NEW METHOD FOR MEASURING THE DEVELOPMENT OF RANCIDITY. Food Technology, vol. 7, p. 191-194, May 1953.
A rapid, objective method was devised for determination of the relative stabilities of dry animal feeds containing 5 percent or more of fat. The method is based on the colorimetric determination of volatile carbonyl compounds formed when the fat becomes rancid.

753 Ricciuti, Constantine, Willits, C. O., Knight, H. B., and Swern, Daniel
POLAROGRAPHIC STUDIES OF OXYGEN-CONTAINING COMPOUNDS. ACID ANHYDRIDES Analytical Chemistry, vol. 25, p. 933-935, June 1953.
Polarographic studies of certain organic acid anhydrides and their corresponding acids and esters showed that the α,β-unsaturated acid anhydrides are polarographically reducible and that the corresponding acids and esters, with the exception of maleic acid, do not interfere with the polarographic waves of the anhydrides.

755 Siedler, A. J., and Schweigert, B. S. (American Meat Institute Foundation; work done under Research and Marketing Act Contract).
EFFECT OF THE LEVEL OF FAT IN THE DIET ON THE GROWTH PERFORMANCE OF DOGS. Journal of Nutrition, vol. 48, p.81-90, September 1952.
The effect on the growth of dogs of adding different levels of a good grade of "inedible" white grease to a basal diet similar to commercial meal was investigated. The rate of gain for a 10-week period, when 4, 6, or 8 percent fat was added to the basal diet or when 6 percent fat was added to a commercial meal, were equal or slightly superior to those obtained when the diets without added fat were fed.

760 Swern, Daniel
EPOXIDATION AND HYDROXYLATION OF ETHYLENIC COMPOUNDS WITH ORGANIC PERACIDS. Organic Reactions, vol. 7, chapter 7, p. 378-433, 1953, (John Wiley & Sons, Inc.).
Reviews the literature on the preparation of oxiranes and α-glycols by oxidation of ethylenic compounds with organic peracids. Typical experimental procedures for the preparation of organic peracids and their utilization in the preparation of oxiranes and α-glycols are given in detail. Approximately 400 literature references are included.

761 Swern, Daniel, Ault, Waldo C. (ERRL), and McCutcheon, John W. (private consultant, New York City; work done under Research and Marketing Act Contract).
A SURVEY ON RESEARCH POSSIBILITIES FOR ANIMAL FATS. AIC-346, January 1953. (Processed.)
Research possibilities for inedible and edible animal fats were investigated. The following major points were studied: (a) Inedible animal fats, their purification, separation and chemical modification, (b) fatty acids and derivatives, and (c) edible animal fat products. Recommendations for future research are made.

762 Swern, Daniel, and Parker, Winfred E.
APPLICATION OF UREA COMPLEXES IN THE PURIFICATION OF FATTY ACIDS, ESTERS, AND ALCOHOLS. III. CONCENTRATES OF NATURAL LINOLEIC AND LINOLENIC ACIDS. Journal of the American Oil Chemists' Society, vol. 30, p. 5-7, January 1953.
Concentrates of natural linoleic acid (linoleic acid content, 85-95 percent) were prepared in 50-72 percent yields from corn oil fatty acids by preferential precipitation of the saturated and monounsaturated fatty acids at room temperature as their urea complexes.

By a similar procedure, concentrates of natural linolenic acid (linolenic acid content, 87-89 percent) were prepared in 55-61 percent yields from perilla oil fatty acids by preferential precipitation of the saturated, monounsaturated, and diunsaturated fatty acids. Although concentrates of natural linolenic acid containing only 66-70 percent linolenic acid were obtained from linseed oil fatty acids, yields were 87-90 percent.

766 Weil, J. K., Witnauer, L. P., and Stirton, A. J.
EVIDENCE FOR α-SULFONATION IN THE REACTION OF PALMITIC ACID WITH SULFUR TRIOXIDE. Journal of the American Chemical Society, vol. 75, p. 2526-2527, May 20, 1953.
Evidence for α-sulfonation in the reaction of palmitic acid with sulfur trioxide lies in the conversion of sodium sulfopalmitic acid to bromopalmitamide and the identity of the X-ray diffraction pattern with that of α-bromopalmitamide.

Patents

January - June

Cording, James Jr., and Shaines, Alfred
FILTER. U. S. Patent No. 2,636,612, issued April 28, 1953.

Swern, Daniel
PLASTIC PLASTICIZED WITH ALKYL ALKOXY HYDROXY STEARATES. U. S. Patent No. 2,624,680, issued January 6, 1953.

Swern, Daniel, and Jordan, Edmund F. Jr.
COPOLYMERS OF UNSATURATED ESTERS OF PHTHALIC ACID. U. S. Patent No. 2,631,141, issued March 10, 1953.

Publications

July - December

782 Herb, S. F., Riemenschneider, R. W., (EURB) and Kaunitz, Hans and Slanetz, Charles A. (Columbia University)
NATURE OF THE "VITAMIN A-LIKE FACTOR" IN LARD. The Journal of Nutrition, vol. 51, p. 393-402, November 1953.
Biological assays on molecular distillates from lard showed that lard contains vitamin A activity equivalent to about 0.4 to 2 units per gram.

Chromatographic fractionation of unsaponifiables from lard and molecular distillates from lard yielded eluates which gave positive Carr-Price tests and typical vitamin A spectral curves except in fractions having extremely high ratio of unsaponifiables to units of vitamin A.

It is concluded that the biological vitamin A activity of lard is largely attributable to the presence of typical vitamin A. The so-called "sparing" action of lard on utilization of added vitamin A in diets is in all probability due to the presence in lard of hitherto unrecognized typical vitamin A.

786 Knight, H. B., Koos, R. E. and Swern, Daniel
ADDITION OF FORMIC ACID TO OLEFINIC COMPOUNDS. I. MONOOLEFINIC COMPOUNDS. Journal of the American Chemical Society, vol. 75, p. 6212-6215, December 20, 1953.
Formic acid at its boiling point at atmospheric pressure adds readily to the double bond of oleic, elaidic and 10-hendecenoic (undecylenic) acids, methyl oleate, oleyl alcohol, cyclohexene, 1-hexene and the unreacted olefinic material separated from the hydrolyzed reaction product of oleic acid with formic acid, yielding the corresponding formate esters which are readily hydrolyzed to hydroxy compounds.

788 Luddy, Francis E., Turner, Arthur, Jr., and Scanlan, John T.
SPECTROPHOTOMETRIC DETERMINATION OF CHOLESTEROL AND TRITERPENE ALCOHOLS IN WOOL WAX. Analytical Chemistry, vol. 25, p. 1497-1499, October 1953.
CORRECTION. ibid. vol. 26, p. 491, March 1954.
The method described is based on the Liebermann-Burchard color reaction and can be applied to unsaponified wool wax, to mixtures of free wool wax alcohol or to precipitated cholesterol digitonide. The entire procedure can be carried out at room temperature.

795 Port, William S., Jordan, Edmund F., Jr., Palm, William E., Witnauer, Lee P., Hansen, John E. and Swern, Daniel.
VINYL PLASTICS MODIFIED WITH CHEMICALS FROM ANIMAL FATS. COPOLYMERS OF VINYL CHLORIDE AND VINYL STEARATE. AIC-366, December 1953 (Processed).
Copolymers of vinyl chloride containing approximately 10 to 45 percent vinyl stearate were prepared in suspension and in emulsion, and tensile, flexural, visocity and low temperature properties were measured. The copolymers can be cured with polyamines to infusible and insoluble materials. Addition of carbon black or silica produces a reinforced plastic which can also be cured.

796 Roe, Edward T., and Swern, Daniel
FATTY ACID AMIDES. VI. PREPARATION OF SUBSTITUTED AMIDOSTEARIC ACIDS BY ADDITION OF NITRILES TO OLEIC ACID. Journal of the American Chemical Society, vol. 75, p. 5479-5481, November 20, 1953.
The addition of acetonitrile, propionitrile, acrylonitrile, benzonitrile, cyanoacetic acid, malononitrile and succinonitrile to the double bond of oleic acid in sulfuric acid solution gives good yields of substituted amidostearic acids,

$$CH_3-(CH_2)_x-CH-(CH_2)_y-CO_2H$$

$$N-H$$

$$C=O$$

$$R$$

799 Swern, Daniel, Coleman, Joseph E., Knight, H. B., Ricciuti, C., Willits, C. O, and Eddy, C. Roland
REACTIONS OF FATTY MATERIALS WITH OXYGEN. XIV. POLAROGRAPHIC AND INFRARED SPECTROPHOTOMETRIC INVESTIGATION OF PEROXIDES FROM AUTOXIDIZED METHYL OLEATE. Journal of the American Chemical Society, vol. 75, p. 3135-3137, July 5, 1953.
Methyl oleate has been autoxidized from 35° to 120° in the presence or absence of ultraviolet radiation. Polarographic and iodometric analysis of the autoxidation mixtures and peroxide concentrates obtained from them has shown that, although the bulk of the peroxides formed are hydroperoxides, a significant proportion is not. Evidence is presented which indicates that the non-hydroperoxide portion probably consists of cyclic peroxides. Furthermore, the hydroperoxides have the trans configuration, predominatly.

800 Swern, Daniel, Coleman, Joseph E., and Knight, H. B. (EURB), Zilch, K. T., Dutton, H. J., and Cowan, J. C. (NURB) and Gyenge, J. M. (Government Laboratories, University of Akron).
PEROXIDES FROM AUTOXIDIZED METHYL OLEATE AND LINOLEATE AS INITIATORS IN THE PREPARATION OF BUTADIENE-STYRENE SYNTHETIC RUBBER. Journal of Polymer Science, vol. 11, p. 487-490, November 1953.
In a dextrose-free recipe at 41° F. for the copolymerization of butadiene and styrene, methyl oleate peroxide (MOP) and methyl linoleate peroxide (MLP) are more efficient initiators on a molar, but not on a weight basis than cumene hydroperoxide (CHP), and they are as efficient as p-menthane hydroperoxide (PMHP). In a peroxide-dextrose recipe at 122°F., at both low and high dextrose levels, only about one-half as much MOP as CHP or PMHP is required on a molar basis to achieve the same conversion and polymerization rate. In a low dextrose-redox recipe at 41° F., MLP appears to be slightly more efficient than CHP or PMHP, but in the amine recipe at 41° F., MLP is less efficient

801 Swern, Daniel and Scanlan, John T.
ELAIDIC ACID. Biochemical Preparations, vol. 3, p. 118-120, October 1953.
A laboratory procedure suitable for use in the preparation of pure elaidic acid is described.

805 Weil, J. K., Bistline, R. G. Jr., and Stirton, A. J.
SODIUM SALTS OF ALKYL α-SULFOPALMITATES AND STEARATES. Journal of the American Chemical Society, vol. 75, p. 4859-4860, October 5, 1953.
Twenty-two esters of alpha-sulfonated palmitic and stearic acids were prepared from normal primary alcohols of 1 to 18 carbon atoms. Sodium secondary butyl α-sulfopalmitate and sodium isopropyl α-sulfostearate were also prepared. The esters are surface active agents.

809 Willits, C. O., Ricciuti, C., Ogg, C. L., Morris, S. G. and Riemenschneider, R. W.
FORMATION OF PEROXIDES IN FATTY ESTERS. I. METHYL OLEATE. APPLICATION OF THE POLAROGRAPHIC AND DIRECT OXYGEN METHODS. Journal of the American Oil Chemists Society, vol. 30, p. 420-423, October 1953.
A study was made of the prolonged autoxidation of methyl oleate to determine the type of peroxide formed and the fate of the absorbed oxygen. This study has shown that the principal peroxide formed is a hydroperoxide and that the oxygen absorbed in the autoxidation forms oxygenated materials other than hydroperoxide.

1954

Publications

January - June 1954

812 Ault, Waldo C.
THE ROLE OF CHEMICAL DERIVATIVES IN SEEKING NEW MARKETS FOR FATS. Journal of the American Oil Chemists' Society, vol. 31, p. 31-33, March 1954.
Various economic and technological factors pertaining to the use of fats as raw materials in the chemical industry are discussed. Fats are a relatively promising raw material for use by this industry because they are available in large quantities and at prices comparable with those of other organic raw materials. The greatest opportunities for development of chemical uses for fats undoubtedly are in those fields where their paraffinic chain, already modified by terminal carboxylation, gives them potential advantage. Fortunately such fields are numerous and show great growth potential.

825 Knight, H. B., Jordan, E. F., Koos, R. E. and Swern, Daniel
REACTIONS OF FATTY MATERIALS WITH OXYGEN. XV. FORMATION OF 9,10-DIHYDROXYSTEARIC ACID AND CLEAVAGE PRODUCTS IN THE OXIDATION OF OLEIC ACID AND METHYL OLEATE IN ACETIC ACID. Journal of the American Oil Chemists' Society, vol. 31, p. 93-96, March 1954.
The autoxidation of oleic acid and methyl oleate in acetic acid solution at 25-30°, 65° and 115-120° with a cobalt salt as catalyst has been studied. The best yields of desired oxidation products were obtained at 65°. Yields of pure 9,10-dihydroxystearic acid, m.p. = < 128°, were 12-17% and cleavage products 64-68%, thus accounting for about 80% of the starting material. At 25-30° and 115-120°, yields of these products were low.

826 Knight, H. B., Koos, R. E. and Swern, Daniel
NEW METHOD FOR HYDROXYLATING LONG-CHAIN UNSATURATED FATTY ACIDS, ESTERS, ALCOHOLS, AND HYDROCARBONS. Journal of the American Oil Chemists' Society, vol. 31, p. 1-5, January 1954.
A new method for hydroxylating long-chain unsaturated compounds is described which involves addition of formic acid at its boiling point to the double bond followed by hydrolysis of the intermediate formate esters. The addition reaction proceeds slowly in the absence of catalysts, but strongly acidic substances, such as perchloric acid, sulfuric acid and boron fluoride-acetic acid complex, speed up the addition tremendously.

829 Luddy, Francis E., Fertsch, George R. and Riemenschneider, Roy W.
GLYCERIDE COMPOSITION OF FATS AND OILS DETERMINED BY OXIDATION AND CRYSTALLIZATION METHODS. Journal of the American Oil Chemists' Society, vol. 31, p. 266-268, June 1954.
The glyceride composition of lard, cottonseed oil, palm oil, and chicken fat was determined by two independent methods (a) systematic fractional crystallization from acetone and (b) oxidation in acetone permanganate solution followed by separation of the azelaoglycerides.

834 Morris, Steward G.
FAT RANCIDITY. RECENT STUDIES ON THE MECHANISM OF FAT OXIDATION IN ITS RELATION TO RANCIDITY. Journal of Agricultural and Food Chemistry, vol. 2, p. 126-132, February 3, 1954.
Reviews the American and English literature of the last 5 or 6 years pertaining to the autoxidation of fats.

The autoxidation mechanism, as now generally accepted, is a chain reaction involving radicals formed at the α-methylene groups adjacent to the double bonds. The radicals consume oxygen and then react with another olefin to give hydroperoxide and another free radical. Each free radical is a resonance hybrid compound of three equivalent structures. The displacement of double bonds occurring in autoxidation can be accounted for by this free radical mechanism.

839 Port, William S., (EURB), Kincl, Fred A. (Fellow, National Renderers Assoc.), and Swern, Daniel, (EURB)
COPOLYMERS FOR WATER BASE PAINTS FROM VINYL ACETATE AND LONG-CHAIN VINYL ESTERS. Official Digest of the Federation of Paint and Varnish Production Clubs, vol. 26, p. 408-412, June 1954.
A recipe and a procedure for the preparation of emulsions of vinyl acetate and vinyl stearate or vinyl palmitate are described. The use of these latices in water base paints is suggested.

842 Radell, Jack and Donahue, E. T.
POTENTIOMETRIC NONAQUEOUS TITRATION OF SUBSTITUTED FATTY ACIDS. Analytical Chemistry, vol. 26, p. 590-591, March 1954.
A method of potentiometric nonaqueous titration has been applied to the analysis of substituted fatty acids.

846 Siedler, A. J. and Schweigert, B. S. (American Meat Institute Foundation and University of Chicago; work done under Research and Marketing Act Contract).
EFFECT OF ADDING STABILIZED ANIMAL FATS ON THE STABILITY OF VITAMIN A IN FEEDS STORED AT ROOM TEMPERATURE. Journal of Agricultural and Food Chemistry, vol. 2, p. 193-195, February 1954.
The stability of vitamin A (as fish liver oil) was investigated in mixed feeds with and without added stabilized animal fats, during the storage of the feeds at room temperature. The stability of the vitamin A was increased when 6 percent choice white grease, stabilized with butylated hydroxyanisole, propyl gallate, and citric acid, was incorporated in the feeds.

847 Stirton, A. J., Weil, J. K. and Bistline, R. G. Jr.
SURFACE-ACTIVE PROPERTIES OF SALTS OF α-SULFONATED ACIDS AND ESTERS. Journal of the American Oil Chemists' Society, vol. 31, p. 13-16, January 1954.
Sodium salts of α-sulfonated palmitic and stearic acids are less soluble but better detergents than salts of α-sulfonated lauric and myristic acids. Sodium salts of alkyl α-sulfopalmitates and α-sulfostearates are readily soluble surface active agents and detergents, stable to acid and alkaline hydrolysis.

848 Swern, Daniel and Dickel, Geraldine Billen
CHEMISTRY OF EPOXY COMPOUNDS. XV. OXIDATION OF LINOLEIC ACID WITH PERACETIC AND PERFORMIC ACID. Journal of the American Chemical Society, vol. 76, p. 1957-1959, April 5, 1954.
Oxidation of linoleic acid with excess peracetic acid yields 9,10,12,13-diepoxystearic acid; with enough peracetic acid to oxidize only one double bond, monoepoxyoctadecenoic acid is obtained. With performic acid, dihydroxydiformoxystearic acid is obtained. Hydrolysis of hydroxyacyloxy compounds or diepoxystearic acid results in only poor yields of 9,10,12,13-tetrahydroxystearic acid.

Patents

January - June

Port, William S., O'Brien, James W. and Swern, Daniel
LUBRICATING OIL COMPOSITIONS. U. S. Patent No. 2,671,760, issued March 9, 1954.

Publications

July - December

860 Ault, Waldo C.
INEDIBLE FATS AND FATTY ACIDS. HISTORY AND TECHNOLOGICAL TRENDS. Journal of the American Oil Chemists Society, vol. 31, p. 486-489, November 1954.
Significant developments in the production and processing of inedible fats and oils are reviewed. Certain trends are called to attention and probable future directions of development are forecast. The increasing significance of research to further growth of the industry is emphasized.

861 Ault, Waldo C. and Riemenschneider, R. W.
ANIMAL FATS IN LEVESTOCK FEEDS. Chemurgic Digest, vol. 13, no. 11, p. 4-5, 19, December 1954.
Progress on development of a substantial new market outlet for inedible animal fats in livestock feeds is described. The advantages of such use for fats are discussed and data showing the economic basis for this use are presented.

868 Evans, John D. (Temple University), Riemenschneider, R. W. and Herb, S. F. (EURB)
FAT COMPOSITION AND IN VITRO OXYGEN CONSUMPTION OF MARROW FROM FED AND FASTED RABBITS. Archives of Biochemistry and Biophysics, vol. 53, p. 157-166, November 1954.
Spectrophotometric fatty acid analyses of marrow fat from six fed and six fasted rabbits were compared in relation to their respective in vitro oxygen consumptions.

872 Highlands, M. E., Licciardello, J. J. (Univ. of Maine Agric. Exp. Sta.) and Herb, S. F. (EURB)
OBSERVATIONS ON THE LIPID CONSTITUENTS OF WHITE POTATOES. American Potato Journal, vol. 31, p. 353-357, November 1954.
The fatty acid compsoition of potato lipids was studied. Linoleic and linolenic acids are present in substantial proportions suggesting that the "off" flavor developed in dehydrated potatoes on prolonged storage results in part from the oxidative rancidity of the lipid material. Accelerated stability tests conducted on the potato lipid tended to support this view.

874 Knight, H. B. and Swern, Daniel
TETRALIN HYDROPEROXIDE. Organic Syntheses, vol. 34, p. 90-93, October 1954. John Wiley and Sons, Inc., New York
The preparation of tetralin hydroperoxide by oxidation of pure tetralin with oxygen is described.

877 Lobunez, Walter (Univ. of Penna.; work done under Research and Marketing Contract).
THE DIPOLE MOMENTS AND STRUCTURES OF ORGANIC PEROXIDES AND RELATED SUBSTANCES. Ph.D. Thesis, University of Pennsylvania, Philadelphia, Penna., 1954.
The electric dipole moments of di-t-butyl peroxide, t-butyl hydroperoxide, cumene hydroperoxide, perlauric acid and dibenzoyl peroxide have been measured in benzene at 30°C. The moments of the di-t-butyl peroxide, t-butyl hydroperoxide and perlauric acid were also measured at 50°C. These measurements represent the first reported values for cumene hydroperoxide and perlauric acid.

The dependency of the polarization on concentration was studied in this work and has shown that the molecules of the solute peroxide are not associated at the studied concentrations.

An improved procedure has been demonstrated for the determinations and calculations in dealing with small dipole moments.

883 Radell, Jack, Eisner, Abner and Donahue, E. T.
ISOLATION OF A NEW FRACTION FROM WOOL WAX ACIDS. Journal of the American Chemical Society, vol. 76, p. 4188-89, August 20, 1954.
A new fraction has been isolated from wool wax acids which corresponds to a delta lactone of molecular formula $C_{20}H_{38}O_2$.

884 Ricciuti, C., Willits, C. O., Ogg, C. L., Morris, S. G. and Riemenschneider, R. W.
FORMATION OF PEROXIDES IN FATTY ESTERS. II. METHYL LINOLEATE: APPLICATION OF THE POLAROGRAPHIC AND DIRECT OXYGEN METHODS. Journal of the American Oil Chemists Society, vol. 31, p. 456-459, November 1954.
This manuscript presents the results obtained by the polarographic, chemical peroxide, direct oxygen, catalytic hydrogenation and iodine value methods applied to methyl linoleate samples subjected to autoxidation at 80°C. for periods up to 267 hours.

885 Riemenschneider, R. W.
ANALYTICAL METHODS AND COMPOSITION OF FATTY MATERIALS. Journal of the American Oil Chemists Society, vol 31, p. 517-523, November 1954.
Analytical methods and procedures useful in determining fatty acid and glyceride composition of fats and oils were discussed. Principal attention was given to a discussion of the essential features of ultraviolet spectrophotometric methods. Typical data obtained in fatty acid and glyceride analyses of some common fats and oils are presented.

886 Siedler, A. J. and Schweigert, B. S. (American Meat Institute Foundation, University of Chicago; work done under Research and Marketing Act Contract)
EFFECT OF FEEDING GRADED LEVELS OF FAT WITH AND WITHOUT CHOLINE AND ANTIBIOTIC B_{12} SUPPLEMENTS TO CHICKS. Poultry Science, vol. 32, p. 449-454, May 1953.
Calories from animal fat added to diet of chicks at 2 to 8% levels were efficiently utilized. Little or no advantage was observed for added choline or choline plus B_{12}.

887 Siedler, A. J. and Schweigert, B. S. (American Meat Institute Foundation, University of Chicago; work done under Research and Marketing Act Contract,
EFFECT OF THE LEVEL OF ANIMAL FAT IN THE DIET ON THE MAINTENANCE, REPRODUCTION AND LACTATION PERFORMANCE OF DOGS. Journal of Nutrition, vol. 53, p. 187-194, June 1954.
The maintenance, reproduction, and lactation performance of Cocker Spaniel dogs fed since weaning a basal ration with and without added fat were observed. The addition of 4 or 8 percent stabilized choice white grease increased the efficiency of the ration for maintenance of the females prior to breeding. On the basis of all performances studied, the results were excellent when 4 percent of the stabilized fat was added to the basal diet.

890 Stirton, A. J.
FAT-BASED SURFACE-ACTIVE AGENTS. Journal of the American Oil Chemists Society, vol. 31, p. 579-586, November 1954.
A review of the chemistry and uses of anionic, cationic and nonionic surface active agents based on inedible fats and fatty acids.

891 Swern, Daniel
PLASTICIZERS. Journal of the American Oil Chemists Society, vol. 31, p. 574-578, November 1954.
External and internal plasticization are discussed. Specific plasticizer for polyvinyl chloride are described. The use of fats for external and internal plasticization is also discussed.

894 Weil, J. K., Stirton, A. J. and Bistline, R. G., Jr.
SYNTHETIC DETERGENTS FROM ANIMAL FATS. THE SULFATION OF TALLOW ALCOHOLS.
Journal of the American Oil Chemists Society, vol. 31, p. 444-447, November 1954.

The mono-unsaturated tallow alcohols, oleyl and elaidyl alcohol, were sulfated with modified sulfating agents, complexes of either sulfur trioxide, chlorosulfonic acid, or sulfuric acid. Reaction involving the double bond was minimized and the products were good detergents and surface active agents, easily soluble at room temperature.